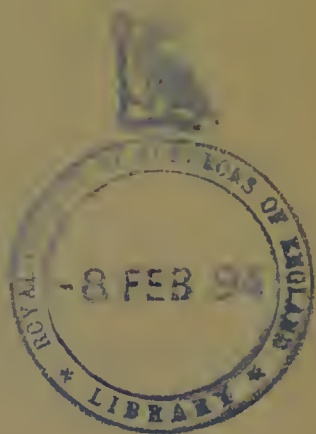


# MEDICO-LEGAL EXPERIENCE 5 IN CALCUTTA

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M.D., F.R.C.P. Edin.; F.R.S. Edin.

*Professor of Medical Jurisprudence in the University of Edinburgh,*

IN ADMIRATION FOR HIS DISTINGUISHED TALENTS,  
AND  
WITH GRATEFUL ACKNOWLEDGMENT OF THOSE LEARNED LECTURES  
IN HIS CLASS  
WHICH FIRST LED TO AN INTEREST IN MEDICO-LEGAL SUBJECTS,  
OF WHICH, IN A DISTANT LAND,  
THE FOLLOWING PAGES RECORD THE RESULTS  
ARRIVED AT BY HIS PUPIL

*The Author.*



## P R E F A C E.

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THESE Papers appeared in the INDIAN MEDICAL GAZETTE, between the years 1888 and 1890. By the permission of the Publishers of this Journal I am now able to reproduce them in their present form.

I am encouraged to do this, as I find that very few original observations have been published on Medico-Legal subjects in India; and I trust that these records will be of use to those members of the profession who are interested in the subject.

EDINBURGH,

*9th February 1891.*



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# PHENOMENA OCCURRING AFTER DEATH.



THROUGH the kindness of Surgeon-General A. J. Payne, M.D., I had two Supernumerary Assistant-Surgeons, Gopal Chunder Mukerjea, M.B., and Obhoy Kumar Sen,\* placed at my disposal to look into certain most important subjects in medico-legal practice—viz., the changes occurring in the human body after death, and the period at which each of them manifests itself. I was desirous of having these observations carried on for a lengthened period, but was unable to retain the services of these Assistant-Surgeons for more than two and a half months. It would appear that in most of our Indian Law Courts, the results of Caspar's observations are assumed to furnish satisfactory data regarding post-mortem phenomena generally—that is post-mortem phenomena are assumed to present exactly the same features, whether they occur under the climatic conditions prevailing in Berlin, or under those of tropical or sub-tropical regions. Even on *à priori* grounds it is evident that any such assumption is unwarrantable, and the present series of observations demonstrate that it is not merely unwarrantable, but inconsistent with fact. I should naturally have preferred delaying any publication of results of the relatively incomplete character which those in the following pages present, but, as in the meantime, there appears to be little chance of any similar observation being carried out, it appears to be desirable to place what information has been obtained in regard to a matter of such great practical import in connection with criminal trials at the disposal of the medical profession.

\* Assistant-Surgeon Guru Nath Sen also helped me greatly in these observations.

I am indebted to Mr Dissent and to the two Assistant-Surgeons I have above named, for the very careful and searching observations they made, and I am sure that if the latter could be extended to a period of about two years, they would be a most useful and accurate guide to medical and judicial officers in India, more especially to those serving in Bengal, and would materially help them to arrive at a mature and accurate judgment in criminal cases in which the time of death has an important bearing on the questions of the guilt or innocence of accused persons.

The observations were made in two sets of 36 and 10 cases respectively.

The first set was on the bodies of 36 natives who had died from the following diseases :—

Diarrhœa, - - - - -	4
Jaundice, - - - - -	1
Dysentery, - - - - -	9
Phthisis Pulmonalis, - - - - -	4
Ulcer, - - - - -	1
Pneumonia, - - - - -	3
Cholera, - - - - -	1
Remittent Fever, - - - - -	4
Malarious Fevers, - - - - -	3
Bronchitis, - - - - -	1
General Debility, - - - - -	1
Debility from Old Age, - - - - -	1
Ague, - - - - -	1
Enlargement of Liver, - - - - -	1
Anæmia, - - - - -	1

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These 36 observations were carried on from the 16th July 1883 to 17th September 1883. The average temperature during the period of the observations was 85·8 F. The average maximum temperature was 89·5 F. The average minimum temperature was 82·5 F. The highest temperature noted was 92° F. on the 13th, 14th, and 17th September. The lowest temperature noted was 79° F. on the 18th July 1883.

MUSCULAR IRRITABILITY.—Of the 36 cases, the duration of muscular irritability was as follows :—

The longest period of duration was 4 hours 30 minutes. The shortest period was 30 minutes. The average period was 1 hour 51 minutes.

In 4 cases it lasted from 30 minutes to 1 hour.

In 16 cases from 1 hour to 2 hours.

In 5 cases from 2 to 3 hours.

In 2 cases from 3 hours and upwards.

In 9 cases it was absent.

COMMENCEMENT OF CADAVERIC RIGIDITY.—In these 36 cases the latest period of the commencement of cadaveric rigidity was 7 hours. The earliest period was 40 minutes. The average period was 1 hour 56 minutes.

In 6 cases it commenced in from 30 minutes to 1 hour.

In 19 cases from 1 hour to 2 hours.

In 5 cases from 2 to 3 hours.

In 2 cases from 3 to 4 hours.

In 3 cases from 5 to 7 hours.

In 1 case it had commenced before observation.

DURATION OF CADAVERIC RIGIDITY.—The longest period of the duration of cadaveric rigidity was 40 hours. The shortest period was 3 hours. The average period was 19 hours 12 minutes.

In 3 cases it occurred in less than 5 hours.

In 6 cases from 5 to 10 hours.

In 3 cases from 10 to 15 hours.

In 6 cases from 15 to 20 hours.

In 14 cases from 20 to 30 hours.

In 4 cases from 30 to 40 hours.

ORDER OF APPEARANCE OF CADAVERIC RIGIDITY.—In 4 cases—1st, in the lower jaw ; 2nd, in the muscles of the neck ; 3rd, in the muscles of the back ; 4th, in the muscles of the upper limb ; and 5th, in the muscles of the lower limb.

In 5 cases—1st, in the muscles of the neck ; 2nd, in the muscles of the back ; 3rd, in the muscles of the lower

jaw ; 4th, in the muscles of the upper extremities ; and 5th, in the muscles of the lower extremities.

In 21 cases—1st, in the muscles of the neck and lower jaw simultaneously ; 2nd, in the muscles of the back ; 3rd, in the muscles of the upper extremities ; and 4th, in the muscles of the lower extremities.

In 6 cases irregularly.

#### ORDER OF DISAPPEARANCE OF CADAVERIC RIGIDITY.—

In 5 cases—1st, in the muscles of the lower jaw ; 2nd, in the muscles of the neck ; 3rd, in the muscles of the back ; 4th, in the muscles of the upper extremities ; and 5th, in the muscles of the lower extremities.

In 4 cases—1st, in the muscles of the lower jaw and neck simultaneously ; 2nd, in the muscles of the back ; 3rd, in the muscles of the upper extremities ; and 4th, in the muscles of the lower extremities.

In 16 cases—1st, in the muscles of the neck ; 2nd, in the muscles of the lower jaw ; 3rd, in the muscles of the back ; 4th, in the muscles of the upper extremities ; and 5th, in the muscles of the lower extremities.

In 4 cases—1st, in the muscles of the neck ; 2nd, in the muscles of the back ; 3rd, in the muscles of the lower jaw ; 4th, in the muscles of the upper extremities ; and 5th, in the muscles of the lower extremities.

In 1 case—1st, in the muscles of the neck and back simultaneously ; 2nd, in the muscles of the lower jaw ; 3rd, in the muscles of the upper extremities ; and 4th, in the muscles of the lower extremities.

In 2 cases—1st, in the muscles of the upper extremities ; 2nd, in the muscles of the neck ; 3rd, in the muscles of the back ; 4th, in the muscles of the lower jaw ; and 5th, in the muscles of the lower extremities.

In 4 cases irregularly.

#### PERIOD OF APPEARANCE OF CADAVERIC LIVIDITY.—

The latest period at which cadaveric lividity appeared was 31 hours 30 minutes. The shortest period was 1 hour 38 minutes.

The average period was 14 hours 33 minutes.

In 6 cases it occurred in less than 5 hours.

In 9 cases from 5 to 10 hours.

In 10 cases from 10 to 20 hours.

In 10 cases from 20 to 30 hours.

In 1 case upwards of 30 hours.

#### PERIOD OF APPEARANCE OF GREEN DISCOLORATION.—

The latest period at which the green discoloration of putrefaction appeared was 41 hours 30 minutes. The earliest period was 7 hours 10 minutes.

The average period was 26 hours 4 minutes.

In 2 cases it occurred under 10 hours.

In 4 cases from 10 to 20 hours.

In 18 cases from 20 to 30 hours.

In 10 cases upwards 30 hours.

In 2 cases it was not observed at all.

PERIOD OF APPEARANCE OF IMMATURE MAGGOTS OR THE OVA OF FLIES.—The latest period at which immature maggots appeared was 41 hours 30 minutes. The earliest period was 3 hours 20 minutes. The average period was 25 hours 57 minutes.

In 2 cases it occurred in less than 10 hours.

In 5 cases from 10 to 20 hours.

In 11 cases from 20 to 30 hours.

In 5 cases upwards of 30 hours.

In 13 cases it was not observable, as the deposit took place in the inside cavities—the mouth, nostrils, etc. etc.

PERIOD OF APPEARANCE OF THE MATURE OR MOVING MAGGOTS.—The latest period of the appearance of the mature or moving maggots was 76 hours. The earliest period was 24 hours 18 minutes. The average period was 39 hours 43 minutes.

In 6 cases it occurred in from 24 hours 18 minutes to 30 hours.

In 16 cases from 30 to 48 hours.

In 11 cases from 48 to 72 hours.

In 1 case upwards of 72 hours.

In 2 cases it was not observed.

PERIOD OF APPEARANCE OF VESICATIONS ON THE SURFACE OF THE BODY.—The latest period of the appearance of vesications on the surface of the body was 72 hours. The earliest period was 35 hours. The average period was 49 hours 34 minutes.

In 17 cases it occurred in from 35 hours to 48 hours.

In 10 cases from 48 to 60 hours.

In 5 cases from 60 to 72 hours.

In 4 cases it was not observed at all.

PERIOD OF FORMATION AND EVOLUTION OF GASES.—This was manifested by the distention of the abdomen, or by the exudation of froth from the mouth and nostrils, or by the expulsion of fæces through the anus.

The latest period at which gases were evolved was 34 hours 30 minutes. The earliest period was 5 hours 50 minutes. The average period was 18 hours 17 minutes.

In 9 cases it occurred in from 5 hours 5 minutes to 10 hours.

In 10 cases from 10 to 20 hours.

In 14 cases from 20 to 30 hours.

In 1 case from 30 to 40 hours.

In 2 cases it was not observed at all.

The second set of observations was on the bodies of 10 natives, who had died from the following diseases:—

Anæmia,	-	-	-	-	-	-	1
Diarrhœa,	-	-	-	-	-	-	3
Ascitis,	-	-	-	-	-	-	1
Remittent Fever,	-	-	-	-	-	-	2
Enlarged Spleen,	-	-	-	-	-	-	1
Pneumonia,	-	-	-	-	-	-	1
Malarious Fever,	-	-	-	-	-	-	1

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These 10 observations were carried on from the 23rd of October to the 2nd of November 1883. The average temperature during the period of the observations was 81·8. The average maximum temperature was 87·1. The



minimum temperature was 74·6. The highest temperature was noted to be 87° F. on the 29th October 1883. The lowest temperature noted was 72° F. on the 24th October 1883.

PERIOD OF DURATION OF MUSCULAR IRRITABILITY.—In 10 cases the duration of muscular irritability was as follows:—

The longest period of its duration was 3 hours 30 minutes. The shortest period was 1 hour. The average period was 1 hour 42 minutes.

In 2 cases it remained 1 hour and less.

In 4 cases from 1 hour to 2 hours.

In 1 case from 3 hours and upwards.

In 3 cases it had passed off before the observation commenced.

COMMENCEMENT OF CADAVERIC RIGIDITY.—The latest period of the commencement of cadaveric rigidity was 2 hours 30 minutes. The earliest period was 25 minutes. The average period was 1 hour 10 minutes.

In 1 case it occurred in less than one hour.

In 6 cases from 1 hour to 2 hours.

In 1 case from 2 to 3 hours.

In 2 cases it was not observed.

DURATION OF CADAVERIC RIGIDITY.—The longest period of the duration of cadaveric rigidity was 47 hours. The shortest period was 4 hours 30 minutes. The average period was 31 hours 30 minutes.

In 1 case it occurred in less than 5 hours after death.

In 2 cases from 20 to 30 hours.

In 2 cases from 30 to 40 hours.

In 3 cases from 40 to 50 hours.

In 2 cases it was not observed.

ORDER OF APPEARANCE OF CADAVERIC RIGIDITY.—In 4 cases—1st, in the lower jaw; 2nd, in the neck; 3rd, in the back; 4th, in the upper limbs; and 5th in the lower limbs.

In 3 cases—1st, in the neck; 2nd, in the jaw; 3rd, in the back; 4th, in the upper limbs; and 5th, in the lower limbs.

In 1 case—1st, in the jaw; 2nd, in the upper limbs; 3rd, in the neck; 4th, in the back; and 5th, in the lower limbs.

In 2 cases it was not observed.

#### ORDER OF DISAPPEARANCE OF CADAVERIC RIGIDITY.—

In 3 cases—1st, in the neck; 2nd, in the back; 3rd, in the upper limbs; 4th, in the lower jaw; and 5th, in the lower limbs.

In 1 case—1st, in the neck; 2nd, in the back; 3rd in the lower jaw; 4th, in the upper limbs; and 5th, in the lower limbs.

In 1 case—1st, in the neck; 2nd, in the back; 3rd, in the upper limbs; 4th, in the lower limbs; and 5th, in the lower jaw.

In 1 case—1st, in the jaw; 2nd, in the neck; 3rd, in the back; 4th, in the upper limbs; and 5th, in the lower limbs.

In 4 cases it was not observed.

#### PERIOD OF APPEARANCE OF CADAVERIC LIVIDITY.—

The latest period at which cadaveric lividity appeared was 21 hours and 30 minutes. The shortest period was 5 hours 50 minutes. The average period was 15 hours 11 minutes.

In 1 case it occurred in from 5 to 10 hours.

In 4 cases from 10 to 20 hours.

In 2 cases from 20 to 30 hours.

It was not observed in 3 cases.

#### PERIOD OF APPEARANCE OF GREEN DISCOLORATION.—

The latest period at which the green discoloration of putrefaction appeared was 47 hours. The earliest period was 16 hours 10 minutes. The average period was 24 hours 16 minutes.

In 1 case it occurred in from 10 to 20 hours.

In 4 cases from 20 to 30 hours.

In 2 cases from 30 to more hours.

In 3 cases it was not observed.



PERIOD OF APPEARANCE OF IMMATURE MAGGOTS OR OVA OF FLIES.—The latest period at which immature maggots appeared was 65 hours.

PERIOD OF APPEARANCE OF MATURE OR MOVING MAGGOTS.—The latest period of the appearance of the mature or moving maggots was 100 hours 40 minutes. The earliest period was 64 hours 50 minutes. The average period was 81 hours 21 minutes.

In 6 cases it occurred in from 60 to 80 hours.

In 3 cases from 80 to 100 hours.

In 1 case upwards of 100 hours.

PERIOD OF APPEARANCE OF VESICATION ON THE SURFACE OF THE BODY.—The latest period of the appearance of vesication on the surface of the body was 87 hours 30 minutes. The shortest period was 23 hours 30 minutes. The average period was 59 hours 8 minutes.

In 2 cases it occurred in from 30 to 50 hours.

In 4 cases from 50 to 60 hours.

In 3 cases from 60 to 80 hours.

In 1 case from 80 to 90 hours.

PERIOD OF EVOLUTION OR FORMATION OF GASES.—The latest period of its appearance was 47 hours. The earliest period was 16 hours 10 minutes. The average period was 29 hours 17 minutes.

In 1 case it occurred in from 10 to 20 hours.

In 6 cases from 20 to 30 hours.

In 3 cases from 30 to 50 hours.

REMARKS.—From the above it will be seen that these observations were made during the rainy season, and for eleven days in October 1883; that the average temperature registered during the period in the rains was 85·8 F., and in October 81·8 F. or 4 degrees less. In the first set of observations the maximum temperature was 89·5 F., while in the second set it was 87·1 F. or 2·4 degrees cooler. In the first set the minimum temperature was 82·5 F., while in the last observations it was 74·6 F. or 7·9 degrees less.

**MUSCULAR IRRITABILITY.**—According to Devergie, as stated by Taylor, the period of this irritability or contractability in muscles of dead bodies in Europe lasts from a few minutes to 24 hours after death. In these observations, however, it will be seen that the longest period was 4 hours 30 minutes during the rains, and 3 hours 30 minutes in October. The shortest period was 30 minutes in the first set, and 1 hour in the second set of experiments.

**CADAVERIC RIGIDITY.**—Taylor says this condition in bodies in Europe begins in from 5 hours to 6 hours after death. Casper says that cadaveric rigidity may come on at any period after death, during a tolerably wide interval of time; in general, however, between 8, 10, and 20 hours, and may continue much longer than is usually supposed, that is, from 1 to 9 days; while in Bengal the latest period of its commencement during the rains was 7 hours, and in October 2 hours 30 minutes. The shortest period was 40 minutes in the rainy season and 25 minutes in October.

The duration of cadaveric rigidity according to Devergie is from 10 to 72 hours, while here it was 3 to 40 hours in the wet season, and from 4 hours 30 minutes to 47 hours in October.

According to Nystin, in Europe this rigidity appears in the following order:—1st, in the muscles of trunk and neck; 2nd, in the muscles of the upper extremities; 3rd and lastly, in the muscles of the lower extremities.

In Bengal, in the rains, in the largest number (21) of cases—1st, in the muscles of the neck and lower jaw simultaneously; 2nd, in the muscles of the back; 3rd, in the muscles of the upper limbs; and 4th, in the muscles of the lower limbs.

In October, in the largest number (4) of cases—1st, in the lower jaw; 2nd, in the neck; 3rd, in the back; 4th, in the upper limbs; and 5th, in the lower limbs.

The order of disappearance of cadaveric rigidity in Europe is, according to Nystin—1st, in the muscles of the trunk and upper extremities; and 2nd, in the muscles of the lower extremities.

In Bengal, in the rains, in the largest number (16) of cases it disappeared:—1st, in the muscles of the neck; 2nd, in the muscles of the lower jaw; 3rd, in the muscles of the back; 4th, in the muscles of the upper extremities; and 5th, in the muscles of the lower extremities: while in October, it disappeared in the largest number (3) of cases—1st, in the muscles of the neck; 2nd, in the muscles of the back; 3rd, in the muscles of the upper limbs; 4th, in the muscles of the lower jaw; and 5th, in the muscles of the lower limbs.

**CADAVERIC LIVIDITY.**—According to Tidy, external cadaveric ecchymoses generally show themselves during the eight or ten hours succeeding death.

In the observations taken at Calcutta during the rains, the latest period at which cadaveric lividity appeared was 31 hours 30 minutes after death, the shortest period was 1 hour 38 minutes, and the average period was 14 hours 33 minutes.

In the second set of experiments, the latest period was 21 hours 30 minutes, the shortest period was 5 hours 50 minutes, and the average period was 15 hours 11 minutes.

**PERIOD OF APPEARANCE OF GREEN DISCOLORATION OF PUTREFACTION.**—Casper states that this discoloration may take place from 24 to 72 hours after death according to the degree of temperature and the subjective condition. Tidy and Taylor, however, state it occurs about the third day after death.

In the cases noted here, in the rains, the latest period at which this discoloration was observed was 41 hours 30 minutes. The earliest period was 7 hours 10 minutes, and the average period was 26 hours 4 minutes. In October, the latest period at which it occurred was 47 hours, and the earliest period was 16 hours 10 minutes.

**PERIOD OF APPEARANCE OF THE MATURE MAGGOTS.**—In the present observations, in the rains, the latest period at which maggots appeared on the body was 76 hours, the earliest period was 24 hours 18 minutes, and the average period was 39 hours 43 minutes.

In the second set of observations, the latest period was 100 hours 40 minutes, and the earliest period was 64 hours 50 minutes.

PERIOD OF THE APPEARANCE OF VESICATIONS ON THE SURFACE OF THE BODY.—Casper says that this occurs in from 14 to 20 days.

In the observations made here, in the rains, the latest period was 72 hours, the earliest period 35 hours, and the average period was 49 hours 34 minutes. In October, the latest period of the appearance of vesication was 87 hours 30 minutes, the shortest period was 23 hours 30 minutes, and the average period was 59 hours 8 minutes.

PERIOD OF FORMATION AND EVOLUTION OF GASES.—Casper says that in about eight or ten days the gaseous products of decomposition begin to be developed and to distend the abdomen.

In the cases observed during the rains, the latest period at which gases were evolved was 34 hours 30 minutes, the earliest period was 5 hours 50 minutes, and the average period was 18 hours 17 minutes; while in October the latest period of its appearance was 47 hours, the earliest period was 16 hours 10 minutes, and the average period was 29 hours 17 minutes.

## EIGHT CASES OF SAPONIFICATION.

---

DURING the nine years that I have been considering, in my notes on medico-legal examinations in Calcutta, I find I have had eight cases of saponification, seven of which are most interesting, as they show that this condition is more readily formed in the human body in the river Hooghly, as well as in the wet damp soil of Bengal during the rainy season, than in Europe.

The first of the eight cases was the body of an adult native female, of about 25 years of age, apparently that of a Mahommedan woman from Behar or the North-Western Provinces, found in the water near the bank of a large tank called Motee Jheel, within the Calcutta race-course, with her throat cut, a portion of the body eaten away by fishes, and apparently having been in the water entangled among the weeds for several days.

I viewed the body near the tank on the evening of the 30th August 1880, at the request of the authorities, and then made a post-mortem examination the next morning, when I took the notes given below.

I examined the body of an adult native female, of about 25 years of age, name unknown, identified to me by Corporal Avinash Chunder Bose. The body was well nourished, and was in an advanced state of saponification, and the external marks on it were:—

An incised-looking wound, 5 inches long, across the front and sides of the lower part of the neck; it was deep down to spine; it was deepest on the right side where the right common carotid artery and right internal jugular vein were cut through; and the trachea and œsophagus were also divided.

An incised-looking wound 5 inches long, on the middle and left side of the back of the neck; it was half-an-inch deep, but did not divide any important structure.



Two incised-looking wounds on the front and upper part of the abdomen, each 1 inch long,  $2\frac{1}{2}$  inches above and to the right of the umbilicus. The lower one was superficial; the other was deep, passed through the muscles of the abdominal wall, and communicated with an incised wound, 1 inch in length, of the anterior margin of the middle of the right lobe of the liver.

The lower portion of the muscles of the abdomen was apparently eaten away by fishes; and the spleen and intestines were protruded through this opening, not injured.

All the internal organs were putrefied, and were anæmic. The heart was empty.

The vessels of the brain were anæmic. None of the internal organs were saponified.

The stomach was full of undigested rice, and small pieces of red chillies.

No bones were fractured.

I gave it as my opinion that the deceased died from hæmorrhage from the divided right common carotid artery and right internal jugular vein.

Unfortunately, in this case, the murderer was never detected, and the name and residence of the victim was not traced so as to enable accurate data to be obtained as to the length of time the body was in the water. The saponified condition of the body was useful, as it preserved the parts, and enabled the structures divided by the wounds of the neck and abdomen to be clearly observed. The undigested state of the food in the stomach clearly points to the fact that the woman had, very shortly before she was murdered, partaken of a meal consisting of rice and chillies.

The next two cases were of more interest to us, as here we have definite data as to the period required for saponification to occur in the soil of Bengal in the rainy season of the year.

The first of these cases is that of a syce or groom named Etwari. At about 9 P.M. of 20th July 1883, while seated on a charpoy or bed, close to the spot where another syce named Madaree was grooming his horse, he received

a kick from the horse, is said to have fallen on his face, and to have expired at once. The next forenoon his son, Shaik Dina, had the body removed and buried in the Manicktolah Mahommedan burial-ground, stating that he had died from malarious fever. On the morning of the 25th July 1883, or about  $4\frac{1}{2}$  days after death, and 4 days after burial, the police were informed by an enemy of Skaik Dina (the deceased's son) that Etwari had not died from disease, but from injuries. The authorities, on receiving this information, had the body exhumed at once and sent to the morgue of the town of Calcutta for post-mortem examination.

I examined the body on the afternoon of the 25th July 1883, or 4 days and 4 hours after interment, when I found it to be in an advanced state of saponification, and to have no external marks of violence on it.

The lungs were healthy.

The heart was healthy, but was saponified. Its cavities were empty.

The liver was healthy, but was saponified.

The spleen was small and congested.

The kidneys were congested.

The stomach, the intestines, and the bladder were healthy. The stomach, the small intestines, and the bladder were empty; the large intestines contained healthy fæces.

The substance of the brain was pulpy from putrefaction.

The vessels of the brain were normal.

There was a simple fracture through the body, and odontoid process of the second cervical vertebra.

There were simple fractures of the spinous processes of the fourth, fifth, sixth, and seventh cervical vertebræ.

I said that in my opinion the deceased died from shock, following the fracture of the odontoid process of the second cervical vertebra.

The history of the next case is as follows:—

An adult Chinese woman, named Athaw, died, according to the statements made by her husband and others, after child-birth. In consequence of a report being circulated attributing her death to the effects of opium taken

by herself, and also alleging that she had been buried alive, the Coroner of Calcutta directed that her body should be exhumed, and an autopsy be made. The woman died on the 30th August 1885, and her body was disinterred early on the morning of the 2nd September, or about 76 hours after burial.

I examined the body at 7 o'clock on the morning of the 2nd September 1885. It was that of an adult Chinese woman, identified to me by Sergeant Joyno-ud-din to be that of Athaw. The body was that of a small, fat, well-proportioned young woman. The body was in an advanced state of saponification, but there were no external marks of violence on it.

The lungs were congested.

The heart was healthy.

The spleen was congested and soft from putrefaction.

The liver and kidneys were soft from putrefaction.

The mucous membrane of the stomach was pale and somewhat anæmic.

The stomach contained about half-an-ounce of a dark brown-coloured jelly-like substance, which emitted an acid and somewhat fæcal odour, and was adherent to the whole surface of the mucous membrane of the organ.

The intestines were healthy. The small intestines were empty. The large intestines contained well-formed fæces.

The bladder was healthy, and was empty.

The uterus was healthy. It was of the normal size and presented none of the signs of having contained a fœtus recently.

The vagina was soft from putrefaction.

The ovaries were small, and were healthy. Neither of them contained a corpus luteum.

The mucous membrane of the larynx, trachea, and large bronchi was of a dirty-red colour, due to putrefaction. They were empty.

The œsophagus was healthy, and was empty.

The substance of the brain was a mass of pulp due to putrefaction.

The vessels of the brain were congested.

No bones were fractured.



I retained the stomach, its contents, a kidney, and a portion of the liver for chemical analysis.

The Chemical Examiner found morphia in the stomach, and I gave it as my opinion that the woman had probably died from the effects of opium-poisoning.

In the last five cases, the saponification occurred in bodies drowned in the river Hooghly.

The first of these occurred in the person of a native stevedore, named Umbica Churn Mookeerjee, who, on the 10th May 1881, while returning from a ship in the harbour, was caught in a severe storm, the boat was upset, and he was drowned. The body was recovered three days after, when I found the body and the internal organs to be saponified.

The second case was that of an adult European (male) named Mr Clarty, who fell off a stage on the 27th September 1881, while going on board a steamer moored close to the river bank. This body was recovered about two days after the accident, when all the external portions of the body were found to be saponified.

In the third case, a European sailor named Henry James Leslie, returning to his ship in a state of intoxication, fell out of the boat which was taking him to his vessel. This occurred on the night of the 6th October 1883, and his body was found on the morning of the 15th, or about 8 days and 10 hours after immersion, when I found the scalp and extremities to have been eaten by fishes. The external parts of the body, the heart, the liver, the spleen, the kidneys, the stomach, the intestines, and the bladder were saponified.

The fourth of these cases, was in the person of a sailor named John Jenkinson, who was drowned on the 2nd February 1885, in the river Hooghly, by the sinking of the boat he was in. The body was not recovered for a little over 15 days, when it was in an advanced state of saponification. Fishes had nibbled away the skin over the knees of the right leg, the left arm, fore-arm and hand, the scrotum, and the penis. The body and the extremities were covered with river mud.

The heart, the liver, the kidneys, the stomach, the intestines, and the bladder were in an advanced state of saponification.

The fifth case was that of a European apprentice, named Walter Chapman, who, on the 26th September 1885, while standing near the rails of his ship holding a rope, missed his footing and fell into the river. His body was recovered about 7 days after, when it was found to be in an advanced state of saponification. Fishes had eaten a small portion of the skin of the dorsum of the foot, the left groin, the back of the left shoulder, and the last phalanx of the great toe of the right foot.

The body, head, neck, and extremities were covered with river mud.

The lungs, the heart, the liver, the kidneys, the stomach, and the intestines were saponified.

The stomach contained undigested flesh and potatoes. The former was entirely saponified, and the latter were not altered in the least.

The dura mater was of a pearly blue colour, and the portions attached to the bones of the skull were of a brick-red colour and were saponified.

REMARKS.—The case of Shaik Etwari and Athaw were most interesting as well as instructive, as they show that the conditions obtaining during the rainy season in the soft and porous soil of Lower Bengal, saturated with moisture and of a high temperature, facilitate this condition of putrefaction, and in three or four days have the power of saponifying the external parts of the body, even though buried in a wooden coffin, as was the case of the Chinese woman Athaw.

The last five cases point to the fact that, in the river Hooghly, during one of the months of the cold season (February), not only the external tissues of a body, but also six of the internal organs were found to be saponified in a little over 15 days; that in one case, during the hot season in the month of May, the external tissues, as well as internal organs, were saponified in 3 days. Lastly, in the hot, steamy, rainy months of September and October,

in the three cases above mentioned, saponification was found, both externally and internally, in from 2 days to 8 days 10 hours.

In the case of the lad Chapman, the fleshy portions of the undigested food in the stomach was converted entirely into adipocere in 7 days.

I find in Taylor's "Medical Jurisprudence" that there is a case on record where the lower part of the body of a female, after exhumation, was found, 14 months after burial, to be saponified; but in this case only the lower parts of the body were in this condition—that is to say, it was saponified to the level to which the water in the grave had reached.

Taylor also says that the shortest period of the occurrence of adipocere in water is a little more than 5 weeks.

Caspar says that Devergie considered it requires about one year to saponify the entire body of a person drowned, and three years in a body buried in the earth. Caspar, however, gives the case of a newly-born infant which came under his own observation where the body was partially saponified in 13 months after burial in a very damp soil.

Caspar mentions another case where the body of a foetus, which had been buried in a garden exactly  $6\frac{3}{4}$  months, was saponified.

Caspar concludes his remarks on the subject as follows:—"The formation of adipocere is not, therefore, likely to occur to any considerable extent in less than three or four months in water, or one-half year in moist earth, though its commencement may be found at a much earlier period."

Tidy mentions a case, published in the "Lancet" of 1873, Vol. I., pages 583 and 498, in which a body, after four months' interment in a dry place at the foot of a stick stack, was found covered with adipocere; and he says that probably the rapidity of the conversion of the body into adipocere was due to the excessive rain that had occurred since the burial.

## THREE HUNDRED AND FIVE CASES OF DROWNING.

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THE next subject I proceed to consider is drowning, of which a considerable number of cases have come under my notice in Calcutta during a period of about nine years.

NUMBER OF CASES.—During this time the bodies of 305 persons drowned were sent to the Calcutta police dead-house for my inspection.

NATIONALITIES OF THOSE DROWNED.—Of these 305 cases, 109 or 35·73 per cent. were the bodies of adult native males; 41 or 13·44 per cent. were those of adult native females; 27 or 8·85 per cent. were native boys; 16 or 5·24 per cent. were native girls; 99 or 32·45 per cent. were the corpses of adult European males; and 13 or 4·26 per cent. were the bodies of persons of other nationalities—10 Africans, 1 Chinaman, 1 Arab, and 1 Goanese.

CAUSES ASSIGNED FOR DROWNING.—The causes given by the authorities for the immersion of these persons were:—

231 or 75·73	per cent.	were cases of accident.
8 or 2·62	per cent.	were cases of suicide.
1 or ·32	per cent.	was a case of murder.
65 or 21·31	per cent.	the police were unable to assign any cause.

THE CAUSES OF SUICIDE.—The reasons assigned for the eight cases of suicide were:—

Family disputes,	-	-	-	4
Insanity,	-	-	-	2
Bodily diseases,	-	-	-	2

WHERE DROWNED.—These 305 persons were drowned in the following places :—

198 or 64·92 per cent. in the river Hooghly.

88 or 28·85 per cent. in tanks.

11 or 3·66 per cent. in wells.

4 or 1·31 per cent. were children drowned in cisterns.

3 or ·98 per cent. in the ditch or moat around Fort William. These were European soldiers.

1 or ·32 per cent. a child drowned accidentally in a tub of water.

MODE OF DEATH.—Of these 305 cases, 297 or 97·37 per cent. persons died from asphyxia, 1 or ·32 per cent. from syncope, 1 or ·32 per cent. from asphyxia and apoplexy, and in 6 or 1·96 per cent. the mode of death could not be ascertained on account of the bodies being in a very advanced state of putrefaction.

CONDITION OF THE BODIES.—Of the 305 cases, in 138 or 45·28 per cent. putrefaction was present; in 5 or 1·63 per cent. the bodies were saponified; in 124 or 40·65 per cent. the bodies were fresh, and in the remaining 38 or 12·45 per cent. no note was made as to their condition.

#### EXTERNAL APPEARANCES.

*Mud, Sand, and Weeds.*—Of the 305 cases, in 155 or 50·81 per cent. sand, mud, and weeds were found on the bodies.

*Mud under Nails.*—In 43 cases, notes were taken regarding the presence of mud or dirt under the nails; and of these, in 21 or 48·83 per cent. it was found. The natives of India, however, cut their nails (unless they have taken a vow not to do so) to the quick, and hence in almost all the native bodies this appearance was absent.

*Retraction of the Penis.*—In 28 cases in which notes were made regarding this condition, in 16 or 57·14 per cent. the penis was found retracted.



## INTERNAL APPEARANCES.

*Condition of the Lungs.*—Of the 305 cases of drowning under consideration, 278 or 91·1 per cent. were congested; 5 or 1·6 per cent. were healthy; and in 22 or 7·2 per cent. I was unable to find any note regarding this condition.

*Position of the Lungs.*—Of the 305 cases of drowning, 41 or 13·4 per cent. were large, overlapped the heart, and were boggy to the touch; in 6 or 1·9 per cent. they were large and spongy to the touch; in 18 or 5·9 per cent. they were large; in 12 or 3·9 per cent. the lungs filled half the pleural cavities; in 55 or 18 per cent. they were collapsed; and in 173 or 56·7 per cent. no notes were kept.

*Contents of the Bronchi and Air-Cells of the Lungs.*—In 282 or 92·4 per cent. frothy sanguineous fluid was found in the bronchi and air-cells of the lungs; in 1 or ·3 per cent., in addition to the fluid, mud was ascertained to be present in the pulmonary bronchi and air-cells; and in 22 or 7·2 per cent. no note was made.

*Heart.*—Of the 285 cases noted, in 142 or 49·82 per cent. dark fluid blood was found in the right side of the heart only; in 1 case or ·35 per cent. it was found in only the left side of this organ; in 17 or 5·95 per cent. in both sides of the heart, but more in the right than in the left side; in 125 or 43·85 per cent. the heart was empty owing to putrefaction, but in these cases the endocardium of the right side of the heart was stained a dark colour, showing that blood had been there, but had been expelled by the gases of putrefaction.

*Liver.*—In the 305 cases of drowning, in 161 or 52·7 per cent. this organ was found to be congested; in 83 or 27·2 per cent. it was healthy; in 24 or 7·8 per cent. it was large and congested; in 3 or ·9 per cent. it was fatty; in 6 or 1·9 per cent. it was large and soft; in 7 or 2·2 per cent. it was fatty and congested; in 2 or ·6 per cent. it was large and hard; in 1 or ·3 per cent. it was small, contracted, and congested; and in 18 or 5·8 per cent. no notes were made.

*Spleen.*—Of the 305 cases of drowning, in 188 or 61·6 per cent. this organ was found to be congested; in 35 or 11·4 per cent. it was healthy; in 25 or 8·1 per cent. it was soft, large, and congested; in 11 or 3·6 per cent. it was large; in 10 or 3·2 per cent. it was large, hard, and congested; in 6 or 1·9 per cent. it was small but healthy; in 1 or ·3 per cent. it was hard and congested; in 5 or 1·6 per cent. it was large and congested; in 10 or 3·2 per cent. it was soft and congested; and in 14 or 4·5 per cent. no note was kept.

*Kidneys.*—The condition of the kidneys in the 305 cases of drowning was as follows:—In 254 or 83·2 per cent. they were congested; in 27 or 8·8 per cent. they were healthy; in 5 or 1·6 per cent. they were large and congested; in 4 or 1·3 per cent. they were fatty; in 2 or ·6 per cent. they were contracted, granular, and congested; and in 13 or 4·2 per cent. no note was made.

*Condition of the Stomach.*—In these 305 cases of drowning, in 281 or 92·1 per cent., this viscus was found to be healthy; in 5 or 1·6 per cent. it was congested; and in 19 or 6·2 per cent. no note could be found.

*Contents of the Stomach.*—In these 305 cases, in 131 or 42·9 per cent it contained food; in 51 or 16·7 per cent. fluid; in 11 or 3·6 per cent. both food and fluid; in 3 or ·9 per cent. weeds as well as fluid were present; in 2 or ·6 per cent. mud as well as fluid; in 2 or ·6 per cent. only mud; in 69 or 22·6 per cent. it was empty; and in 36 or 11·8 per cent. no notes were kept.

*Condition of Small Intestines.*—In these 305 cases of drowning, in 260 or 85·2 per cent. the small intestines were found to be healthy; in 18 or 5·9 per cent. they were congested; and in 27 or 8·8 per cent. no notes were found.

*Contents of Small Intestines.*—In 99 or 32·4 per cent. they contained fæces; in 97 or 31·8 per cent. they were empty; in 27 or 8·8 per cent. they contained fluid; in 11 or 3·6 per cent. bile; in 7 or 2·2 per cent. round worms; in 4 or 1·3 per cent. undigested food; in 1 or ·3 per cent.

mud; in 1 or .3 per cent. they had fluid, as well as round worms; and in 58 or 19 per cent. no notes were made.

*Condition of Large Intestines.*—In 272 or 89.1 per cent. they were healthy; in 5 or 1.6 per cent. they were congested; and in 28 or 9.1 per cent. no notes were taken.

*Contents of Large Intestines.*—In 197 or 64.5 per cent. they contained fæces; in 3 or .9 per cent. fluid; in 1 or .3 per cent. fluid, as well as undigested food; in 1 or .3 per cent. mud; in 40 or 13.1 per cent. they were empty; and in 63 or 20.6 per cent. no notes were retained.

*Bladder.*—In 229 cases, notes were kept regarding this viscus, and in 227 or 99.1 per cent. it was found to be healthy; and in 2 or .8 per cent. it was found to be congested.

*Brain.*—Notes were retained in 290 cases: in 157 or 54.13 per cent. this organ was decomposed or pulpy from putrefaction; in 110 or 37.93 per cent. it was normal; in 21 or 7.24 per cent. it was soft from putrefaction; and in 2 or .6 per cent. the brain was found to be congested.

*Vessels of the Brain.*—Of the 282 subjects in which notes were made, in 268 or 95 per cent. they were found to be congested; in 13 or 4.6 per cent. they were normal; and in 1 case or .3 per cent. there was also extravasation of fluid blood over the surface of the brain.

*Condition of the Œsophagus.*—Notes were retained in 65 cases: in 60 or 92.3 per cent. it was found to be healthy, and in 5 or 7.6 per cent. it was congested.

*Contents of the Œsophagus.*—Of the 65 cases, in 1 or 1.5 per cent. mud was present; in 1 or 1.5 per cent. grass; in 1 or 1.5 per cent. food; in 38 or 58.4 per cent. it was empty; and in 24 or 36.9 per cent. no notes were kept.

*Condition of the Larynx, Trachea, and Bronchi.*—Of the 305 cases of drowning, in 80 or 26.2 per cent. their mucous membranes were congested; in 8 or 2.6 per cent. they were healthy; and in 217 or 71.1 per cent. no notes were kept.



*Contents of the Larynx, Trachea, and Bronchi.*—Of the 305 cases, in 26 or 8·5 per cent. frothy mucus was found; in 9 or 2·9 per cent. mud was present; in 1 or ·3 per cent. mud and straw; in 4 or 1·3 per cent. fluid was found; in 1 or ·3 per cent. mud and frothy mucus were present; in 2 or ·6 per cent. food from the stomach had passed into the air passages; in 19 or 6·2 per cent. they were empty, and in 243 or 79·6 per cent. no notes could be found.

*Uterus.*—Of 45 cases observed, in 42 or 93·3 per cent. it was healthy; and in 3 or 6·6 per cent. it was found to be congested.

*Ovaries.*—Of 45 cases noted, in 36 or 80 per cent. they were found to be healthy; and in 9 or 20 per cent. they were congested.

*Vagina.*—In the 24 cases noted about the condition of the vagina, 24 or 100 per cent. were found to be healthy.

REMARKS.—These notes show that the largest number of persons who were drowned during the period under review, were adult native males; the next in number were adult European males, principally seafaring men; then adult native females, then native boys and girls; and the smallest number were adults belonging to other countries. The causes most frequently assigned for these cases of drowning were—1st, accident; 2nd, suicide; and 3rd, only one case of homicide. The causes given for suicide were family disputes, insanity, and bodily infirmities. The place in which the largest number of persons was drowned was the river Hooghly; after that tanks, then wells and cisterns, the moat around the fort, and, lastly, a tub of water. As in Europe the most common mode of death here was asphyxia. There was only one death from syncope, and another from the combined form of asphyxia and apoplexy. I regret that notes were not kept of some other of the prominent appearances in death by drowning; but, as far as they have been kept, they will, I am sure, be found to be most interesting as well as instructive.

HISTORY OF THE CASE OF MURDER.—The following is a short history of the only case of homicidal drowning I have had:—A native girl named Jethnee, residing in section H town, was missed on the 11th August 1886. A neighbour reported that he had seen a woman named Diljan Raur in a *palki* with the missing girl on that day. The bearers who carried the *palki* were found, and they identified the woman as a person who had hired their conveyance, and had gone to Babu Ghât with a girl in it. At the ghât she had been observed by several people to have crossed the river with the child. The woman was arrested, and confessed that she had taken Jethnee across the river to a place called Sibpore, where, after having robbed her, she had pushed her into a tank, and then held her by the neck below water until she was dead. Diljan took the police to the tank, where the body of the child was found. The body was sent to the Calcutta police dead-house, and I examined it at noon on the 13th August 1886, when I found the following appearances:—

#### EXTERNAL APPEARANCES.

The body was putrefied; the left eye-ball was protruding, the right was in its natural position; the tongue was protruded between the teeth, but was not bitten; and there was dry sand on her body, head, and extremities. There were no external marks of violence on the body.

#### INTERNAL ORGANS.

*Lungs.*—The lungs filled the greater portion of the cavity of the thorax; they were congested, and their bronchi and air-cells were full of pink, frothy fluid.

*Heart.*—The heart was healthy, and was empty. The walls of the right ventricle were stained of a dark red colour. This appearance was absent in the left side of the organ.

*Liver.*—The liver was healthy.

*Spleen*.—The spleen was congested.

*Kidneys*.—The kidneys were congested.

*Stomach*.—The stomach was healthy. It contained two ounces of undigested *dal*, rice, and some fruit.

*Intestines*.—The intestines were healthy. The large intestines contained well - formed fæces. The small intestines were empty.

*Bladder*.—The bladder was healthy, and was empty.

*Larynx, Trachea, and Large Bronchi*.—They were congested, and were empty.

*Uterus*.—The uterus was healthy.

*Ovaries*.—The ovaries were healthy.

*Vagina*.—The vagina was healthy.

*Brain*.—The substance of the brain was pulpy from putrefaction.

*Vessels of the Brain*.—The vessels of the brain were congested.

*Bones*.—No bones were fractured.

I gave it as my opinion that the girl had died from asphyxia or suffocation due to drowning.

The case was tried at the Howrah Sessions, and the woman was convicted.

PERIOD AT WHICH BODIES RISE TO THE SURFACE IN THE RIVER HOOGHLY.—I have found during these nine years that, if there is no obstacle to impede the rising of bodies, they generally floated in the hot and rainy seasons in the river Hooghly in or within 24 hours after immersion, and in the cold season in from 2 to 3 days.

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# ONE HUNDRED AND THIRTY CASES OF HANGING.

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I THINK it may prove interesting to record my experience of the cases of hanging which have occurred in the largest city in India, extending over a period of about nine years, I now give the principal facts regarding the cases which came under my observation during this time.

I had to examine 130 cases of hanging, sent to me by the police during this period. Of these, 65 were males and 65 females. They were all adults and adolescents.

Of these 130 cases, 127 were natives—64 females, and 63 males. The remaining three were—one European male, one Chinaman, and one East Indian female. They were all suicides.

The causes assigned for these persons taking their lives were as follows:—

Family disagreement,	-	-	-	-	-	38
Ill-health,	-	-	-	-	-	35
No reason assigned,	-	-	-	-	-	24
Drunkenness,	-	-	-	-	-	9
Insanity,	-	-	-	-	-	9
Poverty,	-	-	-	-	-	4
False accusations,	-	-	-	-	-	2
Found in possession of counterfeit coins,	-	-	-	-	-	2
Remorse at having led immoral lives,	-	-	-	-	-	2
Grief on account of the death of a near relation,	-	-	-	-	-	1
Serious illness of a child,	-	-	-	-	-	1
Disappointment in love,	-	-	-	-	-	1
Jealousy,	-	-	-	-	-	1
Theft,	-	-	-	-	-	1

Of these 130 cases, no less than 119 or 91·54 per cent. died from asphyxia; 8 or 6·15 per cent. from asphyxia as well as apoplexy; 2 or 1·53 per cent. from syncope; and 1 or ·76 per cent. from apoplexy.

I find from my notes that in 81 cases the position of the tongue was noted, and in 41 or 50·61 per cent. it was found to be protruded between the teeth, but not injured; in 61 cases a note was made as to whether it was bitten, and of these the tongue was found injured in 16 or 26·22 per cent.

A note was made in 40 cases regarding the eyes, and in 15 or 37·15 per cent. the eyes were open and the eyeballs were protruded.

In 21 cases frothy mucus was looked for around the mouth and nostrils, and in 20 or 95·23 per cent. it was found. 91 cases were noted regarding two lines of mucus at the angles of the mouth, and it was present in 23 or 25·27 per cent.

The condition of the fingers was noted in 42 of the persons hanged, and they were found to be flexed or clenched in 17 or 40·47. The condition of the nails was noted in 15 cases, and in every one of them they were found to be of a blue colour.

In 92 cases, 30 or 32·60 per cent. had vaginal or urethral discharges. Out of 23 cases noted, 8 or 34·78 had discharge of fæces from the rectum. In 8 cases the condition of the penis was noted, and in 3 or 37·50 per cent. it was found to be erected.

The hyoid bone was found fractured in 24 cases or 25·80 per cent. out of a total of 93 observed.

Notes were made regarding the thyroid cartilage in 64 persons suspended, and of the cricoid cartilage in 11, and in not one of these was it found to be fractured.

Notes were made in 77 cases regarding the fracture and dislocation of the neck, and in not a single case was there any injury of the vertebræ.

Of the 90 cases in which the coats of the carotid arteries were observed, in 31 or 34·44 they were found to be ruptured. In 16 or 51·61 per cent of these 31 cases,

the internal coats; in 4 or 12·90 per cent. the middle coats; and in 11 or 35·48 per cent. both the internal and middle coats were ruptured.

Out of a total 91 cases noted regarding congestion of the small intestines, it was found to be present in 81 or 89·01 per cent. Of these 81 cases, the congestion was limited in 35 or 43·20 per cent. to the serous coats; in 45 or 55·55 per cent. all the coats were congested; and in 1 or 1·23 per cent. the mucous coat only. The mucous membrane of the larynx, trachea, and large bronchi were found congested in 56 out of 71, showing a percentage of 78·87.

The nature of the cord by means of which these 130 persons committed suicide is noted below:—

73 used ropes of various materials and thickness.

30 suspended themselves by means of their *dhooties*, *sarees*, or *chuddars*.

25 cases were not noted.

One person, a determined suicide, used both a rope and the cloth he wore to destroy himself.

One Brahmin hung himself by his Brahminical thread.

REMARKS.—The above notes point to the fact that in these 130 cases of suicide, family disputes and ill-health were the two principal causes.

The cause of death in the majority of these cases was asphyxia, and not the combined asphyxia and apoplexy, which Caspar in Germany found to be the most frequent mode of death.

I regret that the notes regarding some of the prominent appearances in death by hanging were not recorded in every case; but as far as they have been noted, they are of great interest, especially regarding the appearance of the eyes and eye-balls. In only 37·15 per cent. of the cases noted, the eye-lids were found to be open and the eye-balls protruded.

It will also be seen from these notes that in not a single case was there a fracture or dislocation of the neck, and I can say from memory that this was the case in every one



of the 130 post-mortems given above. The above cases point to the fact, that although fractures of the hyoid bones occurred in 25·80 per cent. of cases, not a single case of fracture of the thyroid or cricoid cartilages was found.

In the cases in which a rope was used, the mark on the neck was well defined, indented, and parchment-like, while in the cases where cloth ligatures were used, the marks were faint, of a reddish colour and not parchment-like, except in places where the cloth was twisted, and where the pressure was great.

The man who committed suicide by means of his Brahminical thread was a big stout Brahmin. He had returned home late at night boisterously drunk, and commenced to abuse his own family and his neighbours. The family, expecting that he would assault them, locked him out of the house into the outer court-yard, where he entered a cow-shed, and hanged himself. He twisted his Brahminical thread into several ply, and was found suspended off the ground by means of it. The mark of the cord round the neck corresponded with the Brahminical thread: it was very narrow, and deeply indented into the skin of the neck, which was parchment-like in appearance.

In not one of the 130 cases were the muscles of the neck, the larynx, trachea, or large bronchi injured; and in none of them was there any extravasation beneath the skin of the neck, or blisters above the constriction of the cord.

## THREE CASES OF STRANGULATION.

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No. 1.—On the evening of the 4th April 1888, one of the native watchmen belonging to the Port Commissioners, while patrolling on the river bank, found a box on the river side wrapped up in gunny and corded with rope; he represented the matter to his native officer, who brought the fact to the notice of the superintendent of his division of the river bank. The superintendent ordered the immediate removal of the box to the local police thannah. Here it was opened by the native officer on duty, in the presence of the Port Commissioners' native officer and watchman, and was found to contain the naked corpse of an adult native male, which had a soft cloth cord round the neck, and was tied by means of jute and hemp cords; the legs were flexed on the thighs, and the thighs on to the abdomen, and tied by means of cords passing round the back of the neck, and then round the lower parts of the fore-arms, the thighs, and the lower part of the body. The body was covered with a piece of dirty cloth, apparently saturated in carbolic acid. There was a small empty phial in the box, labelled as having been supplied, in November 1880, from Messrs Scott, Thomson, & Co.'s branch dispensary in Russell Street, to the Doveton Young Ladies' Institution.

The body was kept for some hours at the thannah, and was identified by a *jamadar syce* in the employ of Messrs Milton & Co., as that of a *syce* named Amzad, belonging to his establishment, who had been absent for 24 hours. This identification was found to be incorrect, as Amzad was found alive in Calcutta a few hours afterwards (Amzad was very like the deceased in size and appearance). The police, on ascertaining that the phial contained ammoniated quinine when supplied to the Young Lady's School, took the durwan and bearer of the institution to identify the body, but they failed to recognise it. Later on, on the



morning of the 5th April, a native woman and a man living in Komedan Bagan, section N town, identified the body to be that of Shaik Haru, a thatcher by profession, who had left his house at Bania Pooker, in the suburbs, at 11 o'clock on the 4th April, and had not returned since. Having obtained this information, the police went to Shaik Haru's house, and brought his wife, who identified the body to be that of her husband, who, she said, had left home on the forenoon of the 4th April with a bill which he wished to realize from Shaik Maher Ali, the khansamah (butler) of the Doveton Young Lady's Institution. The police, on this information, proceeded to the school, and arrested the khansamah, and were eventually able to recover from him and from two khitmutgars (table-servants), named Torab and Bhuttoo, the bill spoken to by the deceased man's wife, the umbrella, the piran (jacket), and shoes belonging to and in possession of Shaik Haru when he left home. Subsequently, the police found the deceased's cap in possession of a person living close to Shaik Mahir Ali's house, who said he had picked it up on the road close to his dwelling.

POST-MORTEM EXAMINATION.—I was sent for by the police to make an inspection and post-mortem examination of the body of Shaik Haru early in the morning of 5th April. The body had just been inspected by the Coroner and Jury as that of Amzad. I found the body to be that of an adult native male, about 30 years of age, of medium size, and of a dark complexion; it was identified to me by Corporal Abdool Sanud to be that of Shaik Haru. The body was tied by means of three cords, one made of jute, another of hemp, and the third of cotton. I found the thighs flexed on the abdomen, and the legs on the thighs, the knees resting on the left side and middle of the chest,  $3\frac{1}{2}$  inches above the left nipple. The left arm was tied above the wrist to the left leg, 10 inches below the left knee. The right arm was tied to the right thigh, 6 inches above the right knee.

The first cord I shall describe was made of jute. It was about half-an-inch in diameter; it was tied round the

lower part of the neck, the knot was double; it was tied on the front of the lower part of the neck, just above the manubrium of the sternum. It was then carried downwards over the middle of the chest behind the knees, then upwards along the left side of the chest, round the back of the lower part of the neck; then downwards along the right side of the chest to the right wrist, where it was tied to a narrow hemp cord, which I call the second cord.

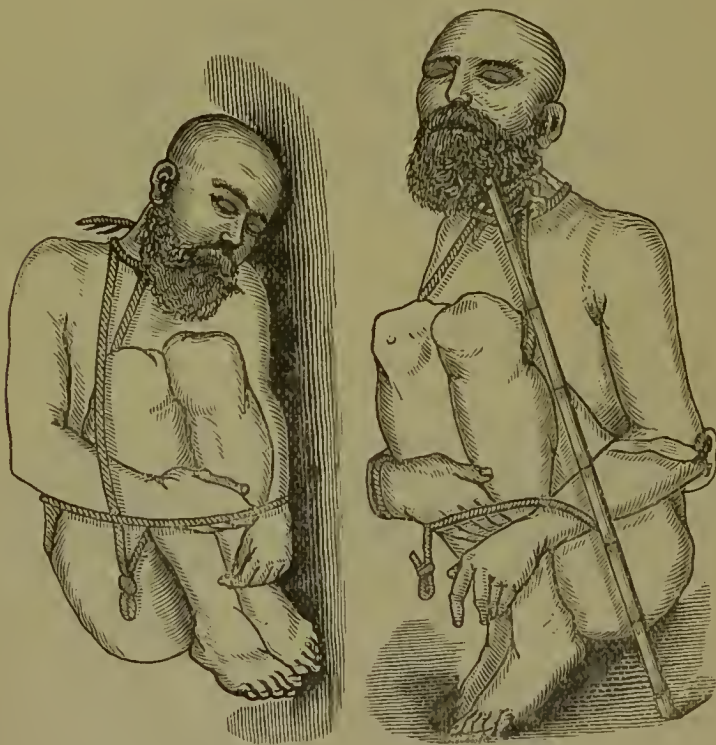


Fig. A.

Fig. B.

This hemp cord was one-eighth of an inch in diameter; at its commencement it was double. It passed from the back of the right wrist downwards, for about 3 inches, to the middle and outer side of the right thigh; it then passed backwards round the lumbar region to the back of the left elbow. At this place the cord became single;

it then passed round the left fore-arm, 3 inches above the back of the left wrist; then across the middle and front of the right thigh, and was tied here to a part of the same cord, where it turned backwards round the lumbar region.

The third cord was made of soft cloth; it was twisted first into two-ply, and then doubled; it was tied tightly round the lower part of the neck; the colour of this cord was white, with a streak of pale red, and another streak of light pale blue in it. It was tied tightly round the lower part of the back of the neck by means of an ordinary double knot. This cord was beneath the jute cord first described.

The picture marked A shows the position in which the deceased lay, and was tied up in the tin box. Picture B shows the position of the deceased while tied, placed in a sitting posture. The stick on the left side of the chin was put to enable the photographer to obtain a better view of the man's features, and had nothing to do with the tying up of the deceased. The deceased's head was flexed towards the front of the chest, and the stick was placed to raise the head and show the face better.

The body was well-nourished, and the following post-mortem appearances were recorded :—

A circular mark of a cord, one-fourth of an inch in diameter, round the lower part of the neck. It was indistinctly marked in front of the neck, but well marked in the sides and back of the neck. The skin beneath this cord was the colour and consistence of parchment. None of the muscles of the neck were lacerated. The hyoid bone, the thyroid and cricoid cartilages, and the rings of the large bronchi were not injured.

There were three superficial abrasions, each the size of a sixpence, on the inner or the mucous surface of the lips, one on the centre of the upper lip and two at the middle of the lower lip.

There was an abrasion 3 inches long and one-eighth of an inch broad on the right cheek, extending outwards from the right angle of the mouth.

The abrasions of the lips, and the abrasion at the right angle of the mouth and on the right cheek had the appearance as if a gag had been applied to the mouth.

Besides these abrasions above-mentioned, there were seven abrasions varying in size from half-an-inch to 12 inches in length on the left fore-arm, the left knee, the right knee, the right fore-arm, the back of the right wrist, the right cheek, and the front of the left shoulder. These had the appearance of having been caused by the jute and hemp cords by which the body had been tied after death, and by pressure while the body was compressed into the box.

Lastly, there were two faint marks of blisters, each about the size of a rupee on the temples.

Rigor mortis was well marked all over the body when I first saw it, but was absent at 2 P.M. when I was called on, after identification, to make the post-mortem examination.

The face was swollen and livid. The eyes were closed. The conjunctivæ were congested. The corneæ were hazy. The pupils were normal. The tongue was protruded between the teeth, and was bitten; it was not, however, large and swollen.

Fluid blood was oozing out of the mouth and nostrils.

On reflecting the scalp, dark clotted blood was found to be extravasated between the scalp and the skull in the left temporal region for a space of about  $1\frac{1}{2}$  inches in length, and half-an-inch in breadth.

The fingers were not clenched.

The mucous membrane of the larynx, trachea, and bronchi was highly congested, and was empty.

The lungs were found to be highly congested. They were adherent to the walls of the thorax by means of extensive old pleuritic adhesions.

The heart was healthy. There was some dark fluid blood in the right side of the heart. The left side was empty.

The liver was highly congested.

The spleen was slightly enlarged; it was hard and congested.

The kidneys were congested.

There was a single patch of congestion, the size of a rupee, along the centre of the greater curvature of the stomach. The stomach contained 4 ounces of half-digested rice and fish, which emitted an acid odour.

The intestines were healthy, and contained semi-consistent fæces.

The bladder was healthy, and contained four ounces of urine.

The gullet was healthy, and contained some food from the stomach.

The substance of the brain was healthy.

The vessels of the brain were congested. There was no effusion of serum over the surface or into the lateral ventricles of the brain.

No bones were found to be fractured.

From the above appearance, I gave it as my opinion that the deceased died from asphyxia due to strangulation.

The three men, Meher Ali, Bhuttoo, and Torab were tried at the Sessions of the High Court. The former was found guilty of murder, and the two latter were acquitted. The Judge sentenced Mehir Ali to be hanged, but his sentence was commuted by the Government to transportation for life.

No. 2.—A native woman of the name of Bhowani Boistomy, accompanied by a man Randass Bawajee, came to Calcutta on the 21st July 1884, and lived in the same apartments at No. 7 Petumber Sing's Lane. They were singing beggars, and apparently came to town on a begging expedition. They seemed to be on friendly terms; they occupied the same room, and were heard singing up to 10 P.M. on the 25th July. At 8 o'clock on the morning of the 26th July, the body of the woman was discovered in a well in the compound of the house in which they resided, with a piece of cloth tied tightly round the neck, and a wound on the left side of the back of the head; it was fresh, and was bleeding; and the man who was living with the woman the night previous had disappeared.



I examined the body at 4 P.M. on the 26th July 1884. It was that of a native woman, of about 40 years of age, and was identified to me by Corporal Fitrut Hossain.

The body was well nourished.

The external marks of violence on it were :—

A broad depressed mark of a cord, 1 inch in breadth, circular in shape, round the upper part of the neck above the thyroid cartilage, and between it and the hyoid bone.

This mark was made by two pieces of cloth, each 3 feet 7 inches long, and 1 inch broad, twisted into a single cord, and tied tightly round the neck by means of three ordinary knots on the right side of the neck.

There was a double row of large wooden beads round the neck below the cord.

A superficial wound, half-an-inch in length, on the left side of the head, 2 inches above the left external ear.

There was some fresh green vegetable matter on the outer side of the right thigh and right leg. These parts had the appearance of having been dragged over this green vegetable matter.

The face was swollen and turgid. The eyes were closed. The tongue was not swollen; it was protruded between the teeth; it was bitten into at its left margin, but not through.

The mark of the cord was parchment-like. There was no injury to the muscles of the neck or to the windpipe.

The lungs were congested.

The heart was healthy. The right side was full of dark fluid blood. The left side was empty.

The liver was large and congested.

The spleen was large and congested.

The kidneys, the stomach, the large intestines, the uterus, the ovaries, the vagina, the windpipe, the gullet, and the substance of the brain were healthy.

All the coats of the small intestine were congested.

No bones were fractured.

I gave it as my opinion that the deceased died from asphyxia, due to strangulation.

The stomach, its contents, a kidney, and a portion of the liver was kept for chemical analysis, but the Chemical Examiner found no poison in any of the organs.

The man, Ram Dass Bawajee, was apprehended some months after the murder. He was tried at the High Court, was convicted of murder, and was hanged.

No. 3.—The third case was as follows:—A gharamee or thatcher, named Gopal Byraggy, who eloped from his native village in the Birmhoom district with a young woman named Bow, *alias* Mooktah, and came to Calcutta, where they lived, in Munshee Sudder-ud-deen's Lane, in lodgings as husband and wife. The neighbours said they frequently quarrelled. On the night of the 8th July 1878 they retired to bed, and on the next morning the man was found absent, and the body of the woman covered with a quilt and a gunny bag, her mouth gagged with a piece of cloth, and a coir rope tied tightly round her neck.

I examined the body on the 9th July 1878. It was that of a native woman of about 25 years of age; it was identified by Corporal Goordoyal Sing to be that of Bow, *alias* Mooktah. The body was well nourished, and the external marks of violence on it were a mark of a cord round the neck, immediately below the thyroid cartilage, and a contusion of the left eye-ball.

There was a piece of cloth twisted twice tightly round the mouth.

There was a double cord made of two twists of thin coir rope tied tightly across the middle of the neck. The skin beneath this cord was parchment-like. There was no extravasation of blood beneath the skin, or into the muscles of the neck. There was no injury to the muscles of the neck, or to the windpipe.

The eyes were closed. The face was not flushed; the tongue was not protruded or bitten by the teeth. The hands were not clenched.

The lungs, the kidneys, the larynx, the trachea, and the vessels of the brain were congested.

The heart was healthy, the right side was full of dark fluid blood; the left side contained a small quantity of fluid blood.

The liver was large and congested.

The spleen was soft and congested.

The intestines, the bladder, the ovaries, the vagina, the uterus, the gullet, and the substance of the brain were healthy.

No bones were fractured.

I stated it to be my opinion that the deceased died from asphyxia or suffocation due to strangulation.

Gopal Byraggy ran away from Calcutta, and was at large for many months. Like most natives he became home-sick, and thinking that he might with safety return home to his native village, he did so, only to be apprehended by the police and put on his trial. He was tried at the Criminal Sessions of the High Court and acquitted, as the only evidence against him was circumstantial, which the majority of the jury (natives) would not rely on.

REMARKS.—These are the only three cases of death from strangulation which I have had during a period extending over ten years while I have been Police Surgeon of Calcutta. They have all been murders. The post-mortem appearances have all been those of asphyxia, and none of the appearances in the air cells of the lungs or about the skin of the face, neck, and chest, and conjunctivæ mentioned by Tardieu were found. In all these cases the eyes were closed. In none of them were muscles or other deep structures of the neck injured. In these cases the tongue was not swollen; in two it was protruded between the teeth, and was bitten into but not through. In none were the fingers clenched.

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## A CASE OF THROTTLING.

THE only case of throttling which came under my notice as Police Surgeon of Calcutta, during the nine years I have referred to, has the following history:—

In August 1884, No. 12 Panchee Dhobee's Lane, Calcutta, was a brothel, in which resided several native prostitutes, each having a separate room. Among these were three women, named Troylokya, Prio, and Raj Kumaree Raur. They lived in separate apartments on the second floor of the house. Troylokya Raur, a Brahmin by caste, was about 35 years of age, and was strong and well built, much above the ordinary size of a Bengalee adult female. The other two, Prio and Raj Kumaree, were small and about the size of ordinary Bengalee women.

On the night of the 19th August 1884, Troylokya Raur induced Raj Kumaree Raur to go to the adjoining bazaar and to purchase some *choora*, or raw flattened rice, and some milk. On her return, Troylokya and Prio mixed the *choora* and milk together and divided it among the three—Troylokya handing Raj Kumaree a cup of it, to which she had added something. Immediately after taking the contents of this cup, Raj Kumaree complained that it had a bitter taste, was shortly after seized with vomiting, and after a time became drowsy, and was removed at her request by Troylokya and Prio Raur to her own apartment, and was put to bed—the former remaining in the room with her with the alleged object of nursing her, while Prio Raur left the room, closing the door after her, and sat in the verandah of the house. Shortly after Prio left the room, a low indistinct noise was heard in the room by Prio, and then all was silent. In a few minutes Troylokya joined Prio in the verandah, observing to her "It is all right; I have throttled her and got the jewellery," at the same time showing her Raj Kumaree's ornaments which she had in her hands. After this Troylokya and Prio retired to their respective rooms. Next morning the body of Raj Kumaree was found by the other inmates of the

house. The case was investigated by the authorities. Prio Raur turned Queen's evidence, and Raj Kumaree's jewellery was eventually found in the secret drawer of the almirah belonging to and in the room Troylokya occupied. This woman was tried at the Criminal Sessions of the High Court, was convicted of murder, and was hung at the Presidency Jail on the 3rd September 1884.

Troylokya Raur was known for several years to the authorities to be associated with a dumb youth in the commission of robberies accompanied with violence, but for want of corroborative evidence could not be punished. Troylokya's plan was to hire a room in a locality inhabited by prostitutes, select a victim from among them, get into her confidence, then represent to her that a priest had taken up his abode in a certain part of the suburbs, and suggest a visit to him, decked out in all her jewels. Troylokya accompanied by her dumb friend, used to take their victim to a secluded part of the suburbs. Troylokya would then suggest to the unsuspecting woman that they should have a bath in a tank, the dumb confederate being left to take care of both women's clothes and the jewellery of the victim. When in the water, Troylokya used to attack the woman, who was always smaller and weaker than herself, and hold her head beneath the water until she was drowned or made her escape. The dumb confederate remained on shore until she returned and took the jewellery of the woman from his charge. Troylokya was arrested and tried on a charge of attempt to murder in the way mentioned above, but for want of corroborative evidence, which her dumb companion was unable to give, she escaped punishment.

POST-MORTEM.—On the 20th August 1884, I made a post-mortem examination on the body of an adult native female of about 35 years of age, identified to me by Corporal Fitrut Hossain to be that of Raj Kumaree Raur. I found the body to be well nourished, and the external marks of violence on it to be an abrasion on the front and lower part of the neck, just above the manubrium of the sternum, and the clavicles, 4 inches long and 3 inches

broad. There were five superficial lacerated wounds on the sides of the neck, four on the left, and one on the right side, apparently made by the finger nails. There was a contusion beneath the skin of the lower part of the front of the neck and upper part of the front of the chest, 8 inches long and 4 inches broad. There were two contusions, each about the size of a rupee, below and behind the rami of the lower jaw. There was a contusion 3 inches long and 2 inches broad on the upper part and outer side of the left thigh. Lastly, there was a contusion 1 inch long and 1 inch broad on the back and middle of the right thigh.

The spots of ecchymosis upon the skin of the face, neck, and chest, as well as in the conjunctivæ of the eyes, described by Tardieu as present in cases of strangulation, were not found.

The mucous membrane of the larynx, trachea, and large bronchi was highly congested. These portions of the windpipe contained frothy mucus of a pink colour.

The left greater cornu of the hyoid bone was fractured.

There were two fractures through the greater or superior cornua of the thyroid cartilage. There were two fractures, one on either side of the cricoid cartilage.

The lungs were highly congested, and their bronchi were full of frothy mucus of a pink colour. The emphysematous and apoplectic conditions of the lungs described by Tradieu were absent.

The heart was healthy. The right side was full of dark fluid blood. The left side was empty.

The liver and kidneys were congested.

The spleen was small and congested.

The stomach was healthy. It was full of half-digested food.

The intestines were healthy. The large contained well formed fæces; the small, semi-consistent fæces.

The bladder was healthy, and was empty.

The uterus, the ovaries, and the vagina were healthy.

The substance of the brain was healthy.

The vessels of the brain were highly congested.

I gave it as my opinion that the deceased died from asphyxia due to throttling.

## THIRTEEN SUDDEN DEATHS FROM SUFFOCATION.

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THIRTEEN deaths came under my notice during the nine years' medico-legal experience that I have been relating.

RACE AND SEX.—These cases comprised 4 adult native males, 2 adult native females, 4 native boys, 1 native girl, 1 adult European male, and 1 East Indian boy.

CAUSE OF DEATH.—All were the result of accidents.

CAUSES ASSIGNED FOR THE ACCIDENTS.—Three causes were assigned for the accidents :—1st, Mechanical pressure on the thorax and face ; 2nd, Foreign substances in the air passages ; and 3rd, Pressure on the mouth and nostrils.

Of the 1st class, there were 8 cases :—

Three persons were crushed under fallen mud walls.

Two were buried under loose earth, which fell on them while in holes or trenches.

Two were crushed in a crowd.

One was crushed by some bags of grain falling on his face and chest.

The 2nd class comprised the following cases :—

A male child was playing with a bone button or stud in his mouth, when it slipped into his larynx, and caused spasm of the glottis, which terminated fatally.

A sailor just recovering from a drinking bout began to eat a piece of meat, when he was attacked with vomiting, and a piece of the meat, then in his mouth, entered into the larynx, and became impacted there.

A native boy, having eaten a quantity of green plums, was seized with vomiting, and while being removed in a gharry or carriage to the hospital, got some of the undigested plums in the vomit into his larynx, which blocked the passage of air into the lungs.

An infant, while sucking at its mother's breast, was suffocated by a sudden rush of milk from the breast, which passed into, and filled the larynx, trachea, and bronchi, to the exclusion of atmospheric air.

In the 3rd class, there is only a single case in which a mother, during sleep, rolled over and smothered her newly-born infant.

*Mode of Death.*—Death in all these cases resulted from asphyxia or apnoea.

*Condition of the Bodies.*—All the bodies were well nourished.

*External Marks of Violence.*—In 6 of these cases external marks of violence were present, and in 7 they could not be found. These external marks were contusions and abrasions.

*Region of these Marks.*—In the 6 cases in which injuries were detected, they were found—in 1 case in the abdominal walls; in 2 on the trunk and extremities; in 1 on the right lower extremity; in 1 on the face, trunk, and right upper extremity; and in 1 on the face only.

*Tardieu's Punctiform Ecchymoses* were not found on the skin of the face, neck, and shoulders in any of these cases.

*Fluid Oozing out of Mouth, Nostril, and Ear.*—Of the 13 cases, in 1 mucus was oozing out of both nostrils, in 1 dark fluid blood was flowing out of the mouth and nostrils, and in 1 there was some fluid blood near each ear. In the remaining 10 nothing was observed about these parts.

*Condition of Larynx, Trachea, and Large Bronchi.*—In 9 cases the larynx, trachea, and large bronchi were congested, in 3 they were not congested, and in 1 no note was recorded.

*Contents of Larynx, Trachea, and Large Bronchi.*—Nothing was found in these tubes in 5 cases, in 3 there



was frothy mucus, in 1 half-digested green plums, in 1 milk, in 1 a piece of undigested flesh, in 1 a bone stud or button, and in 1 no record could be found.

*Condition of Œsophagus.*—In 6 cases the œsophagus was found to be healthy, in 1 to be congested, and in 6 no record was kept.

*Contents of Œsophagus.*—In 4 the œsophagus was found to be empty; and in 9 no note was made.

*Condition of the Lungs.*—They were congested in 13 cases.

*Contents of the Small Bronchi and Air Cells.*—In 9 of these cases they were empty, in 1 they contained white frothy fluid the colour and consistency of milk, in 2 there was frothy mucus, and in 1 no note was retained.

*Tardieu's Spots on the Lungs and Pleura.*—These were not found in a single one of these cases.

*Condition of the Heart.*—The heart in 11 of these persons was healthy, in 1 it was fatty, and in 1 no record was kept.

*Contents of the Heart.*—In 9 cases there was dark fluid blood in the right side of the heart, while the left cavities were empty; in 2 fluid blood was found in both sides of the heart, more in the right than in the left side; and in 2 no record was kept.

*Tardieu's Ecchymoses on Pericardium and Heart.*—These ecchymoses were absent in every case.

*Condition of the Blood.*—The blood of the body was found to be fluid and of a dark colour in 10 of these cases, in 1 fluid, and in 2 no note was retained.

*Condition of the Liver.*—In 6 cases it was congested; in 3 it was large and congested; in 1 it was large, soft, and congested; in 1 large, fatty, and congested; in 1 fatty and congested; and in 1 healthy and not congested.

*Condition of the Spleen.*—8 were congested; 2 were large, soft, and congested; 1 soft and congested; and 2 were healthy and not congested.

*Condition of the Kidneys.*—5 of these were healthy and not congested, and 8 were congested.

*Condition of the Stomach.*—12 were healthy, and 1 was congested.

*Contents of the Stomach.*—5 contained undigested food, 1 half-digested food and green plums, 1 curdled milk, 1 milk, 2 half-digested food, 1 a red-coloured fluid emitting an odour of alcohol, 1 water mixed with bile, and 1 was empty.

*Condition of the Intestines.*—They were all healthy.

*Contents of the Intestines.*—Of these 13 cases, in 7 fæces were found, in 2 fæces and bile, in 1 fæces and round worms, in 1 fæces and undigested fruit, and in 2 they were empty.

*Condition of the Bladder.*—In 11 it was healthy, and in 2 no notes were kept.

*Contents of the Bladder.*—7 were empty, 4 contained urine, and of 2 no notes were found.

*Substance of the Brain* in every instance was found to be healthy, while the

*Vessels of the Brain* were congested in all these cases.

*Fractures of Bones.*—In 2 cases bones were found to be fractured; in 1 a bone was fractured, and there was a dislocation; and in the remaining 10 no injuries to bones were found.

*Bones found Fractured.*—Of the 2 cases where bones were found to be fractured, in 1 the third and fourth left ribs were broken; and in the other the second, third, and fourth ribs of the left sides of the thorax, and the second rib of the right side.

*Fracture and Dislocation.*—In the case in which there was a fracture as well as a dislocation, the fracture was through the right ilium, and the head of the right femur was dislocated on the dorsum ilii.



REMARKS.—I regret that my notes on this subject are not so complete as I would wish, but as far as they go they may be interesting.

Of the 13 persons who were suffocated, 11 were natives, 1 was a European, and the last an East Indian.

These thirteen persons died from accidents in which mechanical force or obstruction was the cause of death—such as pressure on the thorax and face by fallen mud walls and loose earth respectively falling over labourers, people being crushed in crowds, foreign bodies entering into the air passages and preventing the entrance of atmospheric air into the lungs, and by pressure on the chest, as in the case a mother rolling over her infant in sleep.

Asphyxia was found to be the mode of death in all the cases.

On 6 of these 13 bodies, marks of external violence were found.

Tardieu's spots were absent in all the persons.

In only 3 cases was fluid found around the mouth, nostrils, and ears; in 2 fluid blood, and in 1 mucus.

Out of the 12 cases in which notes were found, in 9 the mucous membrane of the larynx, trachea, and large bronchi was congested.

Foreign substances were found in larynx, trachea, and large bronchi of 4 of these 13 bodies; frothy mucus in 3, nothing in 5, and in 1 no record was preserved. In one of the 5 cases in which the larynx, trachea, and large bronchi were empty, the rings of the trachea were compressed and flattened against the opposite side by means of external pressure from the weight of the mud which had fallen on the neck of the man.

Of the cases in which death resulted from the exclusion of atmospheric air from the lungs by means of external substances occupying the air passages—in 3 the obstructions were in the upper portion of the windpipe; and in 1 the obstacle extended down to the minute ramifications of the bronchi and air cells of the lungs.

The lungs in all the cases were congested.

The bronchi and air cells of the lungs were found to be empty in 9; full of white, frothy, milky fluid in 1; frothy mucus in 2; and in 1 no record was kept.

The ecchymoses described by Tardieu were not detected on the lungs, pleuræ, pericardium, or the heart of a single person.

The heart was found to be healthy in 11 persons, fatty in 1, and in 1 no note was kept.

There was fluid blood in 9 of these cases, in the right side of the heart only; in 2 fluid blood was present on both sides, more in the right cavities than in the left; and in 2 no record had been kept.

In 2 of the cases no record was retained regarding the condition of the blood of the body; and in the remaining 11 it was ascertained to be fluid—in 10 of which it was of a dark colour.

The liver was congested, but not diseased, in 6 cases; in 6 it was congested as well as diseased; and in 1 there was no congestion or disease.

The spleen in 8 cases was healthy, but congested; in 3 it was congested and diseased, and in 2 it was healthy.

The kidneys in 8 cases were found to be healthy and congested, and in the remaining 5 they were healthy and not congested.

The stomach was healthy in 12, and congested in 1 body.

The intestines in all these cases were normal.

The bladder in the 11 cases in which notes were found was healthy.

The substance of the brain was healthy, and the vessels of the brain were congested in every case.

In 10 cases the bones were found to be intact, in 2 there were fractures, and in 1 a fracture and a dislocation. In the two cases where fractures only were found, they were limited to the ribs; and in that in which a fracture and dislocation were present, there was also complete compression of the rings of the trachea.

There are three cases of suffocation which I propose to give in detail. In two of these death resulted by

exclusion of atmospheric air from the lungs, and in the third by compression of the windpipe by means of external pressure.

The first of the two cases mentioned, is that of a native female child of about 4 years of age, who, while playing about under a country plum-tree, ate a quantity of its unripe fruit, and was shortly after seized with a severe attack of vomiting. The parents took her to a native practitioner, who, after giving some medicines, recommended that she should be removed to hospital. Her relatives hired a *ticca garri* or local cab, and removed her in it to the nearest hospital, on arrival at which the child was found to be dead. I examined the body the next day, when I found it well nourished. It bore no external marks of violence. The finger nails were of a blue colour, the eyes not sunken, and the skin of the fingers and toes not shrunken. The lungs, the liver, the spleen, the kidneys, and the vessels of the brain were congested. The heart was healthy, the right side full of dark fluid blood, and the left side empty. The stomach, the intestines, the bladder, the uterus, the ovaries, the vagina, and the substance of the brain were healthy. The larynx, trachea, and large bronchi were full of half-digested green plums. The stomach contained a quantity of half-digested green plums. The intestines contained well-formed fæces and half-digested green plums. No bones were fractured.

I expressed it as my opinion that this child died from asphyxia or suffocation, owing to the half-digested green plums passing into the air passages during a deep inspiration while in the act of vomiting.

The second case occurred on the 23rd September 1886, in the person of a European sailor, named James Kelley, who had been drinking heavily for about nine days. On the day above-mentioned, he, being somewhat sober and hungry, went to the kitchen of a sailors' boarding-house, and asked for some food. He was supplied with a mutton chop, while eating which he began to vomit, and was assisted to the side of a drain, when he suddenly became

insensible and was immediately after removed in a carriage to hospital, where, on arrival, he was found to be dead. I examined the body 24 hours after death, when I found it to be that of an adult European male of about 50 years of age. It was well nourished; it had a contusion 1 inch long and half-an-inch broad on the middle of the back and inner side of the right fore-arm. Rigor mortis was well-marked all over the body. The lungs, the liver, the spleen, the kidneys, the stomach, and the vessels of the brain were congested. The heart was healthy; there was dark fluid blood in the right side; the left side was empty. The intestines, the bladder, the œsophagus, and the substance of the brain were healthy. The stomach contained an ounce of a reddish-coloured liquid, emitting a strong smell of alcohol. All the internal organs, also, emitted a strong odour of alcohol. The mucous membrane of the larynx, the trachea, and large bronchi were congested. There was a piece of undigested cooked meat,  $3\frac{1}{2}$  inches long and  $1\frac{1}{2}$  inches broad, firmly wedged into the entrance of the larynx.

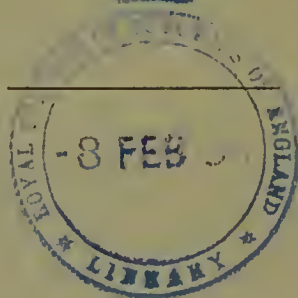
I gave it as my opinion that this piece of meat, which was found fixed at the entrance to the larynx, had prevented the ingress of air into the lungs, and thus suffocated the man.

The following is a short account of the only other case of suffocation which I will relate in detail:—

On the 24th April 1883, Gungu Dhangur, an adult native male, was digging a trench at Fort William, when a quantity of earth fell upon and buried him 4 feet deep. He was dug out in about 30 minutes, but life was extinct. At the autopsy made by me on the body the following day, I found it well nourished, and to have no external marks of injury. Some dark fluid blood was oozing out of the mouth and nostrils. The lungs, the kidneys, and the vessels of the brain were congested. The heart, the liver, the stomach, the intestines, the bladder, and the substance of the brain were healthy. The mucous membrane of the trachea was congested, and the sides of the rings of the

trachea were firmly compressed against each other, completely closing the cavity of this part of the windpipe. There was no mud or sand within the cavity of the larynx, trachea, or large bronchi. There was a dislocation of the head of the right femur on to the dorsum ilii, and a comminuted fracture through the acetabulum of the right ilium. The blood of the body was fluid.

From the compressed and flattened condition of the rings of the trachea, and from the general post-mortem appearance of asphyxia, I gave it as my opinion that the deceased died from asphyxia or suffocation.



# ONE HUNDRED AND ELEVEN CASES OF RUPTURES OF INTERNAL ORGANS.

DURING the period of nine years embraced by my notes on the medico-legal autopsies which have come under my notice as police surgeon of Calcutta, there were 111 ruptures of internal organs.

The following figures show the various ruptures which came under my notice, and the number of each in order of frequency :—

Liver alone,	-	-	-	-	-	-	-	34
Liver and Spleen,	-	-	-	-	-	-	-	3
Liver and Right Kidney,	-	-	-	-	-	-	-	2
Liver and Left Kidney,	-	-	-	-	-	-	-	1
Liver, Spleen, Right Kidney, and Right Lung,	-	-	-	-	-	-	-	1
Liver, Spleen, and Heart,	-	-	-	-	-	-	-	1
Liver and Left Lung,	-	-	-	-	-	-	-	1
Liver and Right Lung,	-	-	-	-	-	-	-	1
Spleen only,	-	-	-	-	-	-	-	29
Spleen and Liver,	-	-	-	-	-	-	-	5
Spleen and Brain,	-	-	-	-	-	-	-	1
Spleen and Left Kidney,	-	-	-	-	-	-	-	3
Spleen and Stomach,	-	-	-	-	-	-	-	1
Spleen and Left Lung,	-	-	-	-	-	-	-	1
Spleen, Spinal Cord, Diaphragm, Right Kidney, Bladder, Liver, Heart, Right Lung, and Left Lung,	-	-	-	-	-	-	-	1
Spleen, Liver, and Right Lung,	-	-	-	-	-	-	-	1
Spleen, Liver, Left Lung, and Right Kidney,	-	-	-	-	-	-	-	1
Intestines only,	-	-	-	-	-	-	-	11
Intestines and Liver,	-	-	-	-	-	-	-	1
Heart only,	-	-	-	-	-	-	-	5
Heart and Spleen,	-	-	-	-	-	-	-	1
Bladder only,	-	-	-	-	-	-	-	2
Ureter only,	-	-	-	-	-	-	-	1
Kidney only,	-	-	-	-	-	-	-	1
Kidney and Liver,	-	-	-	-	-	-	-	1
Uterus and Vagina,	-	-	-	-	-	-	-	1



RUPTURES OF THE LIVER.—The ruptures most commonly met with in my experience in Calcutta have been those of the liver.

I propose to divide these ruptures into those of the liver only, and those of the liver complicated with ruptures of one or more other organs.

RUPTURES OF THE LIVER ONLY.—34 or 30·6 per cent. of the ruptures were those of the liver alone.

*Cause of Rupture.*—Of these 34 cases, 33 or 97·05 per cent of them were the result of accident, and only 1 or 2·94 per cent. was a case of homicide.

*The Causes assigned for the Accidental Cases.*—Fourteen cases were said to have been caused by being knocked down by runaway horses in or without carriages, and by bullock carts.

Eight resulted from falls into the holds of ships and boats.

Two resulted from falls on piles of bricks.

One was that of a man who was knocked down while helping to remove a boiler: the boiler rolled on his back and crushed him to death.

One was that of a man who was killed instantaneously by a bale of jute striking him while it was being hoisted up on board a ship.

One was that of a man struck by a tub full of salt which was being removed from a ship's hold.

One was that of a coolie or porter who, while carrying a heavy box on his head, slipped and fell on his back with the box on the front of his chest and abdomen.

One was that of a man who, while working on board a ship, was struck by a sling containing three 2-maund bags of *dal*.

One, a drunken man, fell heavily on a hard metal road.

One, a syce or groom, was kicked over the abdomen by a horse he was grooming.

One, a lad in a fishing boat which collided with a pontoon of the Hooghly bridge, was precipitated into the



river, and either was driven by the current against the pontoon, or against its mooring chains a few yards below the pontoon.

One was that of a man struck by the handle of a winch in motion.

*The Homicidal Case.*—Two drunken natives had an altercation, one gave the other a push, and the deceased fell heavily on the ground, when he ruptured his liver, and died shortly after.

*Race and Sex of those Injured.*—Of the 34 ruptures of the liver, 19 or 55·8 per cent. occurred in the persons of adult native males; 7 or 20·5 per cent. in adult native females; and 8 or 23·5 per cent. in native boys.

*External Marks of Violence.*—Of the 34 cases, there were external marks of violence in 29 or 85·2 per cent.; and none in 5 or 14·7 per cent.

*Region of External Injuries.*—Of the 29 persons whose bodies showed external injuries, in 2 or 6·8 per cent. the marks were found in the region of the liver only; in 8 or 27·5 per cent. the external marks were found in the hepatic region, as well as in other parts of the body; and in 19 or 65·5 per cent. external injuries were found in parts of the body distant from the liver, such as the head, face, and extremities.

*Fractures of Bones.*—Of the 34 ruptures, fractures of bones were present in 25 or 73·5 per cent.; and in 9 or 26·4 per cent. no fractures were found.

*Bones Fractured.*—In the 25 cases in which fractures were detected, in 7 or 28 per cent. they were limited to the ribs of the right side of the body; in 2 or 8 per cent. to the ribs of the left side; in 6 or 24 per cent. to the ribs of both sides; in 3 or 12 per cent. to the ribs of the right side and to the right femur; in 1 or 4 per cent. to the right ribs and right pelvic bones; in 2 or 8 per cent. to the ribs of the left side and the sternum; in 1 or 4 per cent. to the ribs of both sides and to the right humerus; in 1 or 4 per cent. to the ribs of both sides, the left femur, and left tibia; in 1 or 4 per cent. to the ribs of both sides,

and the crest of the right ilium; and in 1 or 4 per cent. to the sacrum and left femur.

*Condition of the Bodies.*—Of these 34 rupture cases, in 19 or 55·8 per cent. the bodies were well nourished; in 8 or 23·5 per cent. fairly nourished, not emaciated; in 1 or 2·9 per cent. the body was emaciated; and regarding 6 or 17·6 per cent. no note was kept. All the 34 bodies were fresh when examined.

*Condition of the Liver.*—In the 34 cases, the liver was found to be healthy in 6 or 17·6 per cent.; diseased, in 26 or 76·4 per cent.; and no note was found in 2 or 5·8 per cent.

*Weight of the Liver.*—In 30 or 88·2 per cent. of these cases, no mention is made of the weight of this organ; in 1 or 2·9 per cent. it weighed 3 lbs. 6 ounces; in 1 or 2·9 per cent. 2 lbs. 8½ ounces; in 1 or 2·9 per cent. 2 lbs. 7½ ounces; and in 1 or 2·9 per cent. 2 lbs.

*Nature of Ruptures.*—Of the 34 cases mentioned, in 16 or 47·05 per cent. the ruptures were deep; in 4 or 11·7 per cent. the whole or the greater portion of the liver was ruptured into pulp; in 2 or 5·8 per cent. the ruptures were both superficial and deep; in 2 or 5·8 per cent. they were superficial only; and in 10 or 29·4 per cent. no note was kept.

*Site of Ruptures.*—Of the 34 cases, in 6 or 17·6 per cent. the ruptures were on the upper surface of the right lobe; in 3 or 8·8 per cent. they were on the under surface of the right lobe; in 5 or 14·7 per cent. through the whole substance of the right lobe; in 4 or 11·7 per cent. the right lobe was ruptured into pulp; in 3 or 8·8 per cent. the injury was confined to the posterior margin of the right lobe; in 1 or 2·9 per cent. to the anterior margin of the right lobe; in 2 or 5·8 per cent. through the junction of the right and left lobes; in 2 or 5·8 per cent. the ruptures were on both surfaces of the right lobe; in 1 or 2·9 per cent. they were on the posterior margin of the right lobe, and on the under surface of the left lobe; in

1 or 2·9 per cent. on the under surface of the left lobe; in 1 or 2·9 per cent. on both surfaces of the right and left lobes; in 1 or 2·9 per cent. on the anterior margins of the right and left lobes; in 2 or 5·8 per cent. through the whole substance of the right and left lobes, and in 2 or 5·8 per cent. no record was kept.

*Size of Ruptures.*—In 11 or 32·3 per cent. of these 34 cases, the length of the ruptures varied from  $2\frac{1}{4}$  to 5 inches; in 4 or 11·7 per cent. they were from 5 to 10 inches long; in 1 or 2·9 per cent. the rupture was 12 inches in length; in 6 or 17·6 per cent. the organ was reduced to a state of pulp; and in 12 or 35·2 per cent. no note was preserved.

*Cause of Death.*—Out of these 34 cases of rupture, in 18 or 52·9 per cent. the cause of death was hæmorrhage; in 15 or 44·1 per cent. death resulted from shock; and in 1 or 2·9 per cent. it was due to shock as well as hæmorrhage.

*Region where Blood was Effused.*—In 32 or 94·1 per cent. of the 34 cases, the effused blood was found in the abdominal cavity; in 1 or 2·9 per cent. in both pleural cavities; and in 1 or 2·9 per cent. into both pleural and abdominal cavities. In the last two cases mentioned one or more ruptures or injuries of the diaphragm were found.

*Amount of Blood Effused.*—Out of the 34 cases, in 2 or 5·8 per cent. there was 1 to 10 ounces of blood effused; in 2 or 5·8 per cent. from 11 to 15 ounces; in 2 or 5·8 per cent. from 16 to 20 ounces; in 2 or 5·8 per cent. from 21 to 30 ounces; in 6 or 17·6 per cent. from 31 to 40 ounces; in 4 or 11·7 per cent. from 41 to 50 ounces; in 4 or 11·7 per cent. from 51 to 60 ounces; in 5 or 14·7 per cent. the amount of blood was more than 60 ounces; in 2 or 5·8 per cent. "a large quantity"; in 1 or 2·3 per cent. "a quantity;" and in 4 or 11·7 per cent. no notes were kept.

The largest quantity of blood found effused was 96 ounces in one case only; and the smallest amount was 1 ounce in a case in which the death was instantaneous from shock.

*Condition of the Blood.*—In these 34 cases, in 24 or 70·5 per cent. the blood effused was of a dark colour and was fluid; in 2 or 5·8 per cent. it was fluid but not dark; and in 8 or 23·5 per cent. no notes were made.

*Length of Time Persons Survived after the Injury.*—Of the 34 cases, in 6 or 17·6 per cent. death was reported to have occurred instantaneously; in 11 or 32·3 per cent. within an hour; in 4 or 11·7 per cent. in from one to two hours; in 1 or 2·9 per cent. from two to three hours; in 4 or 11·7 per cent. in three to seven hours; in 1 or 2·9 per cent. in three days; and in 7 or 20·5 per cent. the time was not mentioned by the police authorities.

*Months of Year in which the Ruptures Occurred.*—In January, 5 or 14·7 per cent. were noted; in each of the months of March, May, July, and August, 4 or 11·7 per cent.; 3 or 8·8 per cent. occurred in April and November; in September and October, 2 or 5·8 per cent. were recorded in each of these months; in February, June, and December, only 1 or 2·9 per cent. came under observation.

REMARKS.—It will be seen from what I have said that the most commonly ruptured internal organ which I have come across during the nine years' medico-legal practice I am considering, is that of the liver. This is not the experience, however, of Drs Macleod and Harvey, who, in their excellent works on the medico-legal returns received from the civil surgeons in Bengal during a period of five years, found that ruptures of the spleen were more frequent. The reason of this, I believe, is that all the cases which came under my consideration occurred within the town of Calcutta, which is better drained than the civil stations of Bengal; and hence the city population are much less liable to constant and frequent attacks of malarious fever, and are therefore less likely to have enlarged diseased spleens. As ruptures of the liver generally result from extreme violence, people working in a busy and crowded city like Calcutta are much more exposed to the risk of accidents than those living in the country, where there is but little traffic by carriage or

cart, where there are no crowded streets, no shipping, and no loading and discharging of cargo at a rapid rate.

These notes show that the most common cause of ruptured liver is accident, and the most frequent cause of these being people knocked down by runaway horses, and by bullock carts.

I found all the injured persons were natives—55·8 per cent. were adult males, 23·5 per cent. boys, and 20·5 per cent. females. These figures show clearly that the sufferers were principally males, the portion of the population who would require to be about the streets, on board vessels, boats, etc., in pursuit of their various callings.

In 85·2 per cent. of these cases, external marks of injury were present, and in only 14·70 per cent. they were absent.

In 6·8 per cent. of the cases which bore external marks of injury, they were limited to the hepatic region; in 27·5 per cent. they were present in the hepatic region as well as in other parts of the body; and in 65·5 per cent. these marks were found in portions of the body distant from the liver, such as the head, face, and extremities.

In no less than 73·5 per cent. of these cases, fractures of bones existed, showing that the violence required to rupture the liver was of a severe or extreme character. In only 26·4 per cent. fractures of bones were absent.

The paragraph which gives in detail the nature of the fractures, points further to the fact, that the injuries received by the persons who died from these ruptures must have been of a most violent nature.

These notes show that 55·8 per cent. of those who died from these injuries were apparently in good health, as their bodies were found well nourished; in 23·5 per cent. their bodies were not well nourished, but were still not emaciated; in only 2·9 per cent. was the body found emaciated, showing that the person bore external signs of ill health; and regarding the remaining 17·6 per cent. no notes could be found.

76·4 of these persons had diseased livers; 17·6 per cent. had healthy livers; and of 5·8 per cent. no notes were kept.



These two last paragraphs indicate that it is impossible to say from external appearances only, if the liver is diseased, and hence likely to rupture.

The notes regarding the weight of the ruptured livers are very meagre, and hence no deductions can be drawn from them.

In 47·05 per cent. the ruptures of the liver were deep; in 11·7 per cent. the whole or the greater portion of the liver was ruptured and reduced to pulp; in 5·8 per cent. these were deep as well as superficial ruptures; in 5·8 per cent. they were superficial; and in 29·4 per cent. no notes were retained.

The site of the ruptures was in 70·3 per cent. limited to the right lobe of the liver; in 2·9 per cent. to the left lobe; in 14·5 per cent. they were found in both lobes; in 5·8 per cent. they were situated at the junction of right with left; and in 5·8 per cent. no record was found.

These notes point to the fact that ruptures of the liver are most commonly found in the right lobe, and next in both lobes.

The cause of death in 52·9 per cent. was due to hæmorrhage; in 44·1 per cent. to shock; in 2·9 per cent. to the combined effects of shock and hæmorrhage.

This indicates that the most common cause of deaths in these cases was hæmorrhage.

The most frequent place where the blood was effused in these ruptures of the liver was, as was to be expected, in the cavity of the abdomen.

The condition of the blood found in 70·5 per cent. of these ruptures was of a dark colour, and was fluid, showing that a large vein or several small veins had been included in the rupture; while in 5·8 per cent it was fluid but not of a dark colour, showing apparently that one or more arteries of the liver were injured. It will further be observed that in all the cases in which notes were kept, the nature of the effused blood was fluid.

In 50 per cent. of the cases noted, death occurred within an hour of receiving the injury; in 26·3 per cent. death followed in from one to seven hours; in 2·9 per cent. the deceased survived three days.

In this last-mentioned case, the woman who had the ruptures was knocked down by a carriage in motion and received injuries to her left leg, and had two superficial ruptures of the liver, and died from shock.

Of these 34 cases of rupture of the liver, the two which I propose to describe in detail, are, one, and the only homicidal case, and the other the result of a boat accident.

The following is a short history of the homicidal case:— On the 4th February 1880, Sook Chand Karmokar, an adult native male, went on what the police inspector in charge of the case called “the spree.” While in a drunken condition, he had an altercation with another native, who gave him a push, which caused him to fall heavily to the ground, and he received a wound over the left eye-brow. He was removed by his friends to his house, where he died very shortly after.

I made a post-mortem examination on his body about six hours after death, when I found it to be neither well nourished nor emaciated, and the only external mark of violence on it was a contused wound, half-an-inch long, on the upper and outer part of eye-brow, which extended down to the bone. The lungs, the kidneys, the stomach, the intestines, and the bladder were healthy, and were anæmic. The heart was healthy, and was empty. The substance of the brain was healthy. The spleen was enlarged; it was soft and anæmic. The liver was normal in size; its substance was hard and anæmic. There was the cicatrix of an abscess, the size of a pigeon’s egg, on the upper surface of the middle of the right lobe, and a tumour the size of a duck’s egg on the outer side of the under surface of the right lobe of the liver. There was a rupture through the whole substance of the liver 5 inches long at the junction of the right with the left lobe.

There were no marks of injury in the muscles within the cavity of the abdomen in the hepatic region. Five pints of dark fluid blood were found within the abdominal cavity. The vessels of the brain were normal. There was no smell of alcohol in any of the internal organs, no bones



were fractured. I gave it as my opinion that the deceased died from hæmorrhage resulting from the rupture of the liver.

The man who pushed the deceased was tried for culpable homicide not amounting to murder, and his case was disposed of by the magistrate.

I give below the history and result of the post-mortem examination of the case of accidental rupture of the liver, which I propose to consider at some length :—

Sree Ram Mullah, a lad of about 15 years of age, was steering a small native boat called a *dinghee* on the 1st September 1878 to the north of the floating bridge across the river Hooghly. The ebb tide was running very strong, as it always does towards the end of the rainy season of the year, and in attempting to guide his boat through an opening beneath the bridge, between its pontoons, either the strong current swept it against one of the pontoons or the lad did not steer properly, and in place of directing the boat through an open space, steered her on to a pontoon; immediately the boat struck the pontoon, she went to pieces. The persons on board were the lad, his father, and another boatman. The two latter as the boat struck the pontoon jumped on it and received no injuries. The lad in attempting to do the same fell into the river and was swept away by the current beneath the pontoon; being, however, an excellent swimmer, he rose on the other side of it, but before he could strike out and guide his actions in the water he was carried with violence against the moorings of the pontoon. After striking them, he floated down the river for a good distance going a little more than half a mile, when he was picked up by the crew of a boat who brought him on shore; he, however, expired about 15 minutes after being taken out of the water. I made a post-mortem examination on the body about 10 hours after death, when I found it to be well nourished and the external marks of violence to consist of two contusions—one, the size of a rupee or a florin, behind the right external ear; the other, 4 inches long, on the left

side of the thorax between the eighth and ninth left ribs. The lungs, the liver, the spleen, the kidneys, the stomach, the intestines, and the bladder were healthy, and were anæmic. The heart was healthy, and was empty. The vessels of the brain were normal. The substance of the brain was healthy. There were several deep ruptures along the posterior border of the right lobe of the liver. There was a large quantity of blood effused into the abdominal cavity. No bones were fractured.

I stated it as my opinion, that the deceased died from hæmorrhage from the ruptures of the liver.

This case is of interest, as it shows that after excessive injuries to the liver, and with hæmorrhage going on, a person can swim or float in a strong tide for a considerable distance.

COMPLICATED RUPTURES OF THE LIVER.—Of the 111 cases of ruptures of internal organs, 10 or 9 per cent. were ruptures of the liver complicated with ruptures of other internal organs, in which, however, the principal cause of death was due to rupture of the liver.

*Cause of Rupture.*—All these cases were the result of accident.

*Causes Assigned for the Accidents.*—Four cases were persons run over by carriages, tram-cars, or carts.

Two resulted from falls into the holds of vessels.

One a fall from a ship's top-gallant yard into the river Hooghly, striking the foretop sail and the foreyards in his fall.

One a fall on a ship's deck, in an epileptic seizure.

One by a ship's yard falling on his person.

One struck violently by the prow of a large boat in motion.

*Race and Sex of those Injured*—

4 or 40 per cent. were native adult males.

3 or 30 per cent. were adult European males.

2 or 20 per cent. were native boys.

1 or 10 per cent. was a native girl.

*External Marks of Violence.*—Of these 10 cases, external marks of violence were present in 8 or 80 per cent., and absent in 2 or 20 per cent.

*Region of External Marks.*—In the 8 cases in which external marks of violence were present, in 6 or 75 per cent. the marks were found in parts of the body remote from the hepatic region, such as the face, extremities, left side of the thorax, etc.; and in 2 or 25 per cent. they were found in the hepatic region, as well as in other parts of the body.

*Fractures of Bones.*—Bones were found to be fractured in 8 or 80 per cent. of these cases, and in 2 or 20 per cent. no injuries of bones were present.

*Region of Fractures.*—Of these 8 cases, in 4 or 50 per cent. the fractures were limited to the ribs of the right side of the body; in 1 or 12·5 per cent. to the ribs of both sides; in 1 or 12·5 per cent. to the ribs of both sides, the sternum, some bones of the hand, and some vertebræ; in 1 or 12·5 per cent. to several ribs of the right side and some vertebræ; and in 1 or 12·5 per cent. to several of the right ribs, to both bones of the right leg, and to both bones of the left fore-arm.

*Condition of the Body.*—Out of the 10 cases, 6 or 60 per cent. were well nourished, in 3 or 30 per cent. no notes were kept, and in 1 or 10 per cent. the body was in an advanced state of decomposition.

*Condition of the Liver.*—In 6 or 60 per cent. the liver was found to be diseased, in 3 or 30 per cent. it was healthy, and in 1 or 10 per cent. no note was retained.

*Weight of Liver.*—No notes could be found as to the weight of the liver of these 10 persons.

*Nature of Ruptures.*—Of these 10 cases, in 1 or 10 per cent. the liver was ruptured and reduced to pulp; in 1 or 10 per cent. the right lobe was ruptured into pulp; in 1 or 10 per cent. the under surface of the right lobe was ruptured and was in a state of pulp; in 1 or 10 per cent. the posterior margin and upper surface of the right

lobe was ruptured and was in a pulpy state; in 1 or 10 per cent. the ruptures were deep; in 2 or 20 per cent. they were both deep and superficial; and in 3 or 30 per cent. no notes were found.

*Site of Ruptures.*—Out of the 10 cases under consideration, in 1 or 10 per cent. the rupture was on the upper surface of the right lobe; in 2 or 20 per cent. on the under surface of the right lobe; in 3 or 30 per cent. on the posterior margin and upper surface of the right lobe; in 1 or 10 per cent. on both surfaces of the right lobe, and the under surface of the left lobe, as well as on the posterior border of both lobes; in 1 or 10 per cent. on both surfaces of the right lobe, and the upper surface of the left lobe; in 1 or 10 per cent. the whole organ was ruptured into a mass of pulp; and in 1 or 10 per cent. the right lobe was ruptured and reduced to a pulpy mass.

*Size of Ruptures.*—In 3 or 30 per cent. of these cases the length of the ruptures varied from 2 to 4 inches; in 2 or 20 per cent. from 1 to 7 inches; in 4 or 40 per cent. the whole or part of the liver was a mass of pulp; and in 4 or 10 per cent. no notes were kept.

*Cause of Death.*—In 5 or 50 per cent. of these cases death resulted from shock, and in 5 or 50 per cent. from hæmorrhage.

*Region where Blood was Effused.*—In 7 or 70 per cent. blood was found in the abdominal cavity; in 2 or 20 per cent. in both the abdominal and pleural cavities; and in 1 or 10 per cent. no note was made.

*Quantity of Blood Effused.*—In 3 or 30 per cent. the quantity of blood effused varied from 8 to 10 ounces; in 1 or 10 per cent. there were 12 ounces; in 3 or 30 per cent. there were from 40 to 90 ounces; in 2 or 20 per cent. the amount noted was a "large quantity;" and in 1 or 10 per cent. no record could be found.

*Condition of the Blood.*—In 5 or 50 per cent. it was dark and fluid; in 1 or 10 per cent. it was dark, fluid, and clotted; and in 4 or 40 per cent. it was not noted.

*Length of Time Persons Survived after Receipt of Injury.*—In 5 or 50 per cent. death resulted instantaneously; in 2 or 20 per cent. within half-an-hour; in 1 or 10 per cent. within an hour; and in 2 or 20 per cent. no notes were kept.

*Months of the Year in which Ruptures Occurred.*—In February, April, June, and August, 2 or 20 per cent. of cases occurred in each month; and in May and November, 1 or 10 per cent. in each.

REMARKS.—It will be seen that 60 per cent. of these cases were accidents on board ships and boats, and 40 per cent. resulted from carriage, tram, or cart accidents. All the European males were sailors, and 50 per cent. of the adult native males were lascars or native seamen; 20 per cent. were native boys, and 1 or 10 per cent. was a girl.

External marks of violence were present in 80 per cent. of the cases, and absent in only 20 per cent.

These external marks were found in only 25 per cent. of the cases in the hepatic region, as well as in other parts of the body; while in 75 per cent. these were found in other parts of the body distinct from the hepatic region.

Bones were found fractured in 80 per cent. of the cases, showing that the nature of the accidents was of a violent character.

In all these cases, ribs were found to have been fractured, and in 37.5 per cent. the ribs as well as other bones were broken.

The liver was found in 60 per cent. to be diseased, in 30 per cent. it was healthy, and in 10 per cent. no record was kept.

From the nature of these ruptures, it will be seen that the liver was, in the 70 per cent. of cases in which notes were kept, found to be seriously and irrecoverably injured.

The ruptures in 70 per cent. of the cases were limited to the right lobe, in 20 per cent. they were found in the right and left lobes, and in 10 per cent. the whole of the liver was ruptured and reduced to pulp.



In half the cases, the persons who received the injuries died from shock, and in the others from hæmorrhage.

Blood was found in the abdominal cavity in 70 per cent. of the cases, in 20 per cent. in the abdominal and pleural cavities, and in 10 per cent. it was not noted.

In 70 per cent. of the cases, the quantity of blood found varied from 8 to 90 ounces, in 20 per cent. it was noted only as a "large quantity," and in 10 per cent. it was not recorded.

In the majority of the cases in which the condition of the blood effused was recorded, it was found to be fluid, and of a dark colour.

In all the cases regarding which notes were found, the persons died within an hour of the receipt of the injury.

**RUPTURE OF THE SPLEEN.**—After ruptures of the liver, ruptures of the spleen have been most commonly observed in the course of my medico-legal experience in Calcutta.

During the period of nine years that I have been considering, I met with 43 cases, of which 29 were not complicated with ruptures of other organs, and 14 in which one or more of the other internal organs were injured.

I propose to deal with ruptures of the spleen, as I did those of the liver, under two heads. First, those in which the only lesion was one or more ruptures of this organ; and, secondly, those in which the ruptures of the spleen were complicated with ruptures of other viscera.

**UNCOMPLICATED RUPTURES OF THE SPLEEN.**—There were recorded in the period referred to, 29 cases, or 67·4 per cent. of uncomplicated ruptures of the spleen.

*Cause of Rupture.*—These 29 ruptures were referred to the following causes:—In 23 or 79·3 per cent. to accidents; in 4 or 13·7 per cent. to homicide; and in 2 or 6·8 per cent. the injuries were spontaneous ruptures.

*Particulars or Nature of the Accidents.*—Of these 5 or 21·7 per cent. were results of kicks from horses, all on



persons of syces or grooms; 5 or 21·7 per cent. were owing to falls from heights, as from off the roofs of houses, etc; 3 or 13 per cent. were caused by heavy weights falling on the region of the abdomen of coolies or porters—in the first case by a bag of country produce falling on a coolie, in the second by a bale of jute striking a coolie, and, thirdly, by a heavy wooden case or box falling on a coolie; 3 or 13 per cent. were cases of persons falling into the holds of ships and pontoons; 2 or 8·6 per cent. were cases of persons knocked down and injured by runaway horses; 1 or 4·3 per cent. was caused by a country boat being swept by the violence of the bore or tide under a steamer, and one of the crew being crushed between the boat and the vessel; 2 or 8·6 per cent. were of men falling down on the road and off steps; 1 or 4·3 per cent. of the cases was that of a boy subject to epileptic seizures, who either received injuries in an epileptic attack when not observed, or the rupture was the result of the kind attentions of his mother, who, to relieve the pain he complained of in his abdomen, rubbed it for some time with her hands; and in 1 or 4·3 per cent. of the cases no cause was assigned.

*Causes assigned for the Homicidal Cases.*—In 2 or 50 per cent. they were due to blows, one in a quarrel, and one in a drunken brawl—the blow in this case being inflicted with a large heavy wooden pin; in 1 or 25 per cent. by being pushed against a brick wall; and in 1 or 25 per cent. of the cases, death was the result of a kick received by a native from a European.

*Race and Sex of Injured Persons.*—Of the 27 persons who died from uncomplicated ruptures of the spleen, 24 or 82·7 per cent. were adult native males; 3 or 10·3 per cent. were adult native females; 1 or 3·4 per cent. was a native boy; and 1 or 3·4 per cent. a native girl.

*External Marks of Violence.*—In 20 or 68·9 per cent. of these cases no external marks of violence could be detected, and in 9 or 31 per cent. they were present.

*Spontaneous Ruptures.*—The spontaneous ruptures will be considered in detail further on.

*Region of External Marks of Injury.*—Of the 9 cases in which external marks of injury were present, in 6 or 66·6 per cent. they were found on parts of the body distant from the region of the spleen; and in 3 or 33·3 per cent. they were found in the splenic region, as well as in other parts of the body.

*Fractures of Bones.*—In 22 or 75·8 per cent. no injury to any bones was found, while in 7 or 14 per cent. fractures were present.

*Bones found Fractured.*—In 2 or 28·4 per cent. several ribs of both sides of the thorax were fractured; in 1 or 14·2 per cent. the lowest three ribs of the left side of the chest were fractured; in 1 or 14·2 per cent. the lowest eight ribs of the left side, the left ilium, and four lower cervical vertebræ were injured; in 1 or 14·2 per cent. some bones of the skull and the left radius were fractured; in 1 or 14·2 per cent. the injury was limited to the left humerus; and in 1 or 14·2 per cent. there were fractures of the base of the skull.

*Condition of the Bodies.*—In 19 or 65·5 per cent. the bodies were found to be well nourished; in 8 or 27·5 per cent. they were neither well nourished nor emaciated; in 1 or 3·4 per cent. it was emaciated; and in 1 or 3·4 per cent. no note was found.

Putrefaction had not commenced in any of these 29 bodies when examined.

*Condition of Spleen.*—This organ in 28 or 96·5 per cent. was found to be diseased, and in only 1 or 3·4 per cent. to be healthy.

*Weight of Spleen.*—The weight of the spleen was not taken in 20 or 68·9 per cent. of the cases; and in 9 or 31 per cent. it was found to vary from 10 ounces to 3 lbs. 14 ounces.

*Size of Spleen.*—The following statement shows the size of the spleens ruptured :—

NUMBER OF CASES.	LENGTH OF SPLEEN.	BREADTH OF SPLEEN.
2	12 inches.	7 inches.
2	14 "	8 "
1	12 "	9 "
1	12 "	4 "
1	12 "	3 "
1	9 $\frac{1}{4}$ "	5 $\frac{1}{2}$ "
1	9 "	8 "
1	8 $\frac{1}{2}$ "	6 "
1	8 $\frac{1}{2}$ "	5 "
1	8 "	5 "
2	7 "	5 "
1	7 "	4 $\frac{1}{2}$ "

Eleven were only noted as large, and in three no note of any measurement was kept.

*Nature of Ruptures.*—Out of these 29 cases of rupture, in 14 or 48·2 per cent. they were deep; in 2 or 6·8 per cent. the viscus was reduced to pulp; and in 13 or 44·8 per cent. no note was kept.

*Site of Ruptures.*—The site of the ruptures in these 29 cases were as follows:—In 9 or 31 per cent. they were on the inner surface and through the hilus; in 4 or 13·7 per cent. on the inner surface; in 2 or 6·8 per cent. on the inner surface and lower end; in 2 or 6·8 per cent. on the inner surface and upper end; in 1 or 3·4 per cent. on the inner surface, the lower end, and the outer surface; in 1 or 3·4 per cent. on the outer surface; in 2 or 6·8 per cent. on both surfaces; in 2 or 6·8 per cent. on both surfaces and at the upper end; in 1 or 3·4 per cent. at both ends, through the hilus and the posterior border; in 1 or 3·4 per cent. at the lower end; in 2 or 6·8 per cent. through the whole substance of the spleen; and in 2 or 6·8 per cent. the organ was reduced to pulp.

*Number of Ruptures.*—In 11 or 37·9 per cent. there was a single rupture; in 7 or 24·1 per cent. two; in 5 or

17·2 per cent. three; in 1 or 3·4 per cent. four; in 3 or 10·3 per cent. five ruptures; and in 2 or 6·8 per cent. the viscus was ruptured into pulp.

*Amount of Blood Effused.*—In 6 or 20·6 per cent. the quantity of blood varied from  $2\frac{1}{2}$  to 30 ounces; in 5 or 17·2 per cent. from 31 to 64 ounces; in 9 or 31 per cent. from 65 to 100 ounces; in 3 or 10·3 per cent. from 101 to 122 ounces; in 2 or 6·8 per cent. the abdominal cavity was noted as full of blood; in 2 or 6·8 per cent. it was described as “a large quantity” of blood; in 1 or 3·4 per cent. “several pints;” and in 1 or 3·4 per cent. as “a quantity.”

*Condition of the Blood.*—In 12 or 41·3 per cent. the blood was noted as dark and fluid; in 10 or 34·4 per cent. as fluid; in 4 or 13·7 per cent. as dark fluid and clotted; in 1 or 3·4 per cent. as dark and almost clotted; in 1 or 3·4 per cent. it was called fluid and clotted; and in 1 or 3·4 per cent. no record could be found.

*Region where the Blood was Effused.*—In all these 29 cases the blood was found in the abdominal cavity.

*Length of Time the Persons Survived after Receipt of the Injury.*—Death occurred in 20 or 68·9 per cent. within half-an-hour after receipt of the injury; in 1 or 3·4 per cent., from half-an-hour to 1 hour; in 1 or 3·4 per cent., from 1 to 2 hours; in 1 or 3·4 per cent., from 2 to 6 hours; in 1 or 3·4 per cent. the injured person survived 18 hours; and in 5 or 17·2 per cent. no note was made.

*Causes of Death.*—The cause of death in 25 or 86·2 per cent. of the cases was hæmorrhage; in 2 or 6·8 per cent. death resulted from shock; in 1 or 3·4 per cent. the deceased succumbed from the combined effects of shock and hæmorrhage; and in 1 or 3·4 per cent. from peritonitis; this was the case which survived the accident 18 hours.

*Condition of the Stomach.*—In 7 or 24·1 per cent. the stomach was found to be full of food; in 4 or 13·7 per cent. the stomach contained from 6 to 12 ounces of food;

in 2 or 6·8 per cent. it contained a small quantity of food ; in 6 or 20·6 it contained some fluid ; in 6 or 20·6 per cent. it was empty ; and in 4 or 13·7 per cent. no notes were retained.

*Months in which Death Occurred.*—In each of the months of January, March, and November, 4 or 13·7 per cent. of the cases occurred ; August and December, 3 or 10·3 per cent. in each month ; in each of the months of February, April, May, and June, 2 or 6·8 per cent. ; and in July, September, and October, 1 or 3·4 per cent.

REMARKS.—From these notes it will be observed that 79·3 per cent. of these ruptures were the result of accidents, 13·7 per cent. were homicidal, and 6·8 per cent. occurred spontaneously.

It will be seen that the largest number of cases of rupture of the spleen was the result of accidents, the next in number was homicidal, and the least frequently occurring were spontaneous ruptures.

The homicidal cases point to the fact that injuries to the spleen caused by Europeans striking natives in Calcutta are very rare. The persons who died from this particular form of rupture of the spleen were all natives, and in the majority of cases were adult native males.

It will be seen that in 68·9 per cent. no external marks of injury were present ; in 31 per cent. they were seen : only in 33·3 per cent. of these were they in the region of the spleen, and even these were not limited to this quarter but were found in other parts of the body as well ; and in the remaining 66·6 per cent. they were found in parts of the body remote from the spleen.

The large percentage of cases in which there were no external marks of injury support what Casper says in his book on "Forensic Medicine," and which is as follows:—*"It is the rule in all such injuries as are followed by instant or very sudden death, particularly in all cases of rupture of internal organs proving rapidly fatal from internal hæmorrhage, for the body to exhibit no external appearance of violence—presupposing of course that*

the origin of the injury be not of itself of a penetrating nature, as a gunshot, etc.—because during the short remaining life of the wounded person there is no time for the production of ecchymosis.”

In 75·8 per cent. there was no injury to the bones, while in 24 per cent. there was.

The injuries to bones in the majority of these cases were limited to the ribs.

Most of the bodies in which this rupture occurred were well nourished, and showed no external appearance of disease; but in no less than 96·5 per cent. the spleen was found to be diseased. This is an important fact, and clearly shows that the natives of the country often have diseased spleens without showing in the least any appearance of being ill.

In the majority of these cases the ruptures were in the inner surface, and in 34·4 per cent. the hilus was involved.

The ruptures were found to exist singly in 37·9 per cent.; and in the rest there were multiple ruptures, or the whole organ was crushed into pulp.

In the largest number of cases a considerable quantity of blood was effused into the abdominal cavity.

The condition of the blood in the largest number of these cases was found to be fluid.

The length of time before death occurred in these rupture cases, in no less than 68·9 per cent., was within half-an-hour after receipt of the injury.

The cause of death it will be observed in 86·2 per cent. of these cases was hæmorrhage.

These ruptures of the spleen occurred during every month of the year, the largest number (four) occurring in the months of January, March, and November; three cases in August and December; two in February, April, May, and June; and in July, September, and October, one case only in each month.

HISTORY OF THE ONE CASE OF ACCIDENTAL RUPTURE OF THE SPLEEN.—The case of accidental rupture of the



spleen which I propose to consider in detail is that of a native boy named Dooma, an epileptic, of about twelve years of age, who, on the evening of the 20th June 1878, was playing marbles with two other boys, when they quarrelled, and he was struck a blow on the abdomen by one of his playmates. He complained of pain in his abdomen on the 21st and 22nd June; on the 23rd the pain was less; and on the morning of the 24th the pain became very severe, and his mother rubbed the skin over the painful parts with mustard oil, and the boy died suddenly after this was done.

I examined the body about 24 hours after death, when I found it to be well nourished and to have no external marks of violence. All the internal organs, except the spleen, were healthy and were anæmic. The heart was empty; the spleen was large, soft, and pulpy. There were three ruptures of the spleen, two on its inner and one on its outer surface, each 2 inches in length. There were several pints of blood extravasated into the abdominal cavity. No bones were fractured. I gave it as my opinion that the boy died from hæmorrhage from the ruptures of the spleen.

The question arose in this case: was the spleen ruptured by the blow which one of the lad's companions gave him on the 20th June 1878? or did the rubbing which the mother gave rupture the organ? or whether the boy unobserved had an epileptic seizure and fell down on the morning of his death and ruptured his spleen? As the ruptures were recent, and as there were no clots about the region, I gave it as my opinion that the probable cause was the rubbing by his mother, or it might have resulted from an unobserved fall on the day of his death.

BRIEF HISTORIES OF THE CASES OF SPONTANEOUS RUPTURE OF THE SPLEEN.—The two cases of spontaneous rupture of the spleen, which came under my notice during the nine years' experience I have been giving occurred in 1878.

The history and post-mortem appearances of the first of these are as follows:—

On 5th March 1878, a beggar woman named Kaminy, of about 30 years of age, who had been suffering from enlargement of the spleen for several years, complained, at half-past three o'clock in the morning, of severe pain in her abdomen in the region of the spleen. No remedies were applied or given to her internally, and very shortly after she expired. I made an autopsy on the body on the same forenoon, when I took the following notes:—

The body was that of a native female of about thirty years of age. It was identified as that of Kaminy Bewa. The body was much emaciated, and the abdomen was somewhat enlarged. There were no external marks of violence on it. The abdominal walls were not bruised. The lungs, the heart, the stomach, the intestines, the bladder, the larynx and the trachea, the œsophagus, the uterus, the vagina, the ovaries, and the substance of the brain were healthy and were anæmic. The liver was large, fatty, and anæmic. The kidneys were fatty and anæmic. The vessels of the brain were anæmic. The spleen was 12 inches long, 7 inches broad, and weighed 3 lbs. 14 ounces. Its substance was very hard, and there were two ruptures, each an inch long, on the inner surface and lower end. There were several pints of serum in the abdominal cavity. There was 40 ounces of dark blood of the colour and consistence of black currant jelly in and around the spleen. No bones were fractured. I expressed it as my opinion that the woman died from spontaneous rupture of the spleen.

The second case was in the person of an adult native male of about 25 years of age, who had been suffering from malarious fever and enlargement of the spleen, and who had, on the evening of the 29th December 1878, applied for medical relief at the dispensary of the Mayo Hospital. As he appeared to be weak, after receiving medicine he walked away slowly, with the assistance of a lathi or thick stick, along the strand or bank of the river Hooghly for a distance of about half-a-mile southward to

a ghat or landing-place close to the Calcutta end of the Hooghly bridge. On reaching this spot he sat down, and shortly after had several convulsions, vomited a good deal, and died in about half-an-hour. I examined the body about 12 hours after death, when I found it to be well nourished, and to have no external marks of violence on it. The lungs were healthy, and there were extensive recent pleuritic adhesions of the outer surface of the left lung to the inner surface of the thorax. The spleen was about 12 inches long, 8 inches broad at its lower, and 3 inches at its upper end. It was hard. There were two ruptures on its inner surface and through its hilus, each 2 inches long. All the other internal organs were healthy and were anæmic. The heart was empty. There was a quantity of serum effused over the surface of the brain. There was a large quantity of dark fluid blood extravasated into the abdominal cavity. No bones were fractured. In this case also I gave it as my opinion that the deceased had died from spontaneous rupture of the spleen.

HISTORIES OF THE HOMICIDAL RUPTURES OF THE SPLEEN.—I shall give below short histories of the four homicidal cases of rupture of the spleen.

The first case occurred on the 15th September 1878, in the person of a native male of about 35 years of age, named Shaik Kulloo. He was cook to a Mr R. On that day he complained that he was suffering from malarious fever and was unable to work. In the afternoon of the same day, about 4 o'clock, he lay down in an empty cart on a piece of waste land near his master's house, an East Indian boy upset the cart, and he was precipitated to the ground. Shortly after, he was standing near his master's house when two relatives of the boy dragged him into the compound of their own house, from where his master was summoned by them shortly after to remove him, and the master found the man insensible and gasping; he took him home, where he died a few minutes after. I made an autopsy on the body the next day,

when I found no external marks of violence on it. The liver was large, soft, fatty, and anæmic; the spleen large, soft, and anæmic. There was a rupture 4 inches long on its inner surface and lower end. There was a large quantity of blood extravasated into the abdominal cavity. The kidneys were fatty and anæmic. All the other internal organs were healthy and were anæmic. I stated it as my opinion that the deceased died from rupture of the spleen. The two persons who dragged the man into their house were convicted at the Criminal Sessions of the High Court, and were each sentenced to six months' rigorous imprisonment.

The second case which came under my observation occurred on the 8th April 1879, in the person of a mulla or boatman, named Chummun, who, about midnight on the 7th April 1879, got drunk in the company of several other boatmen, and whilst staggering about the river bank, one of his drunken companions seized a thick wooden pin, with which country boats are moored by means of a rope to the river bank, and struck him, while he was bending forwards, across the lower part of the back. He fell on the ground and died in a few minutes. I made a post-mortem examination on his body about 12 hours after death, when I found it to be well nourished and to show no external or internal marks of injury. The liver was large and fatty. The spleen was 12 inches long and 4 inches broad; it was soft and friable. There were two ruptures on its inner surface, each 3 inches long; and one on its outer surface, 2 inches long. All the other viscera were healthy, and were anæmic. The vessels of the brain were healthy, and were anæmic. The heart was empty. There were 120 ounces of dark fluid blood in the abdominal cavity. The ninth, tenth, eleventh, and twelfth ribs of the left side were fractured a few inches external to their cartilages. I said that the man had died from hæmorrhage from the ruptures of the spleen. The man who struck him was charged at the Criminal Sessions of the High Court on three counts; 1st, culpable homicide not amounting to murder; 2nd, causing grievous hurt;

and 3rd, causing hurt. He was found guilty by the Jury on the third count, and was sentenced, on the 22nd April 1879, to five months' rigorous imprisonment.

The history of the third case is as follows:—A native lad named Shaik Mungloo, of about 16 years of age, went to the house of a Mrs B., on the 27th January 1880, to ask for some money which was due to him. He was told to go away, but as he did not do so a European, Mr F., who was present, stated that he shouted at him and pretended to run after him with the object of making him leave the premises, and that the lad ran down a staircase and died shortly after, implying that he must have had a fall while running downstairs. The other inmates of the house, however, alleged that the boy was kicked in the abdomen by Mr F., and died shortly after. The case was tried at the Criminal Sessions of the Calcutta High Court, and the accused was sentenced to six months' rigorous imprisonment. I made a post-mortem examination on the body on the 28th January 1880, when I found it to be neither well nourished nor emaciated. There were no external marks of violence on it. The only internal organ which was diseased was the spleen; it was large and soft. There was a deep stellate rupture of the external surface dividing it into five irregular fragments; there was also a deep rupture of the internal surface and upper end. There were five pints of dark fluid and clotted blood in the abdominal cavity. All the internal viscera were anæmic. The heart was empty. I said the deceased died from hæmorrhage from the ruptures of the spleen.

The fourth and last of these ruptures is that of a dhoby or washerman named Nilmoney, who, about 10 P.M. of the 24th January 1882, had an altercation with another dhoby named Anundo, during which the latter pushed the former against a brick wall and struck him several blows with his clenched fists, which caused his death within half-an-hour. I examined the body the next day, when I found it to be well nourished and to exhibit no



external marks of violence, no injuries or ecchymoses beneath the skin, in the muscles of the left side of the abdomen, or within the cavity of the abdomen. With the exception of the spleen, all the internal organs were healthy and were anæmic. The heart was empty and contracted. The spleen was soft and congested. There was a deep rupture, 7 inches long, across the middle of the inner surface and upper end. There was  $6\frac{1}{2}$  pints of dark fluid, and 6 ounces of dark clotted blood, in the abdominal cavity. No bones were fractured. I found that the cause of death was hæmorrhage from rupture of the spleen. Anundo absconded and has not been seen or heard of since.

COMPLICATED RUPTURES OF THE SPLEEN.—Out of 43 ruptures of the spleen, 14 or 32·5 per cent. were accompanied by injuries of other organs.

Of these, 5 or 35·7 per cent. were complicated with ruptures of the liver; 3 or 21·4 per cent. with those of the left kidney; 1 or 7·1 per cent. with laceration of the brain; 1 or 7·1 per cent. of the stomach; 1 or 7·1 per cent. with lacerations of the left lung; 1 or 7·1 per cent. with injuries of both lungs, the heart, the spinal cord, liver, bladder, right kidney, and diaphragm; 1 or 7·1 per cent. with lacerations of the left lung, and ruptures of the liver and right kidney; and 1 or 7·1 per cent. with lacerations of the right lung and ruptures of the liver.

*Cause of Ruptures.*—Of these fourteen ruptures, 13 or 92·8 per cent. were the result of accident, and 1 or 7·1 per cent. was homicidal.

*Reasons assigned for the Accidents.*—In 5 or 38·4 per cent. the cause was falling into the holds of vessels; in 3 or 23 per cent. falls from heights, as from roofs of houses and from off high ladders; in 2 or 15·3 per cent. the injuries resulted from being knocked down by runaway horses; in 2 or 15·3 per cent. persons were crushed by brick buildings falling on them; and in 1 or 7·6 per cent. from being run over by a cart—this case was of a boy



who fell off the front of a bullock cart, and a wheel of the cart passed over his body.

*Homicidal Case.*—The case of homicidal rupture will be given in detail further on.

*Race and Sex of those Injured.*—All the injured persons were natives: 10 or 71·4 per cent. were adult males, 2 or 14·3 per cent. were boys, and 2 or 14·3 per cent. were adult females.

*External Marks of Violence.*—In 11 or 78·5 per cent. external marks of violence were found, and in 3 or 21·4 per cent. they were absent.

*Region of External Injuries.*—Of these eleven cases, in 8 or 72·7 per cent. the external marks were found on parts of the body distant from the left hypochondrium, and in 3 or 27·2 per cent. they were visible in the splenic region as well as on other parts of the body.

*Fractures of Bones.*—Bones were fractured in 10 or 71·4 per cent. of these cases, and in 4 or 28·5 per cent. they were not injured.

*Bones found Fractured.*—The ribs of both sides of the thorax were fractured in 3 or 30 per cent. of the cases; those of the left side in 2 or 20 per cent.; the base of the skull in 1 or 10 per cent.; the left ribs and left clavicle in 1 or 10 per cent.; several ribs of the left side, the skull, and the right femur in 1 or 10 per cent.; several vertebræ, all the ribs, the sacrum, the right and left ilia, the right pubis and ischium, and the right tibia and fibula in 1 or 10 per cent.; and the ribs of the left side, the left ulna, the left tibia and fibula, and the base of the skull in 1 or 10 per cent.

*Condition of the Bodies.*—The bodies of 13 or 92·8 per cent. of these cases were well nourished, and only 1 or 7·1 per cent. was fairly well nourished.

*Condition of the Spleen.*—The spleen in 13 or 92·8 per cent. of the cases was diseased, and in 1 or 7·1 per cent. was healthy.

*Weight of the Spleen.*—In 1 or 7·1 per cent. the weight was 3 lbs. 4 drachms; in 1 or 7·1 per cent. 14½ ounces; and in 12 or 85·7 per cent. no note was kept.

*Size of the Spleen.*—In 6 or 42·8 per cent, the spleen was noted as being large; in 3 or 21·4 per cent. no note was made; in 1 or 7·1 per cent. the size was 11 inches long and 6½ inches broad; in 1 or 7·1 per cent. it was 9½ inches long and 7 inches broad; in 1 or 7·1 per cent. it was 9 inches long and 5 inches broad; in 1 or 7·1 per cent. it was 6 inches long and 4 inches broad; and in 1 or 7·1 per cent. the organ was said to be small.

*Nature of Ruptures.*—The spleen in 5 or 35·7 per cent. of cases was ruptured into pulp; in 2 or 14·2 per cent. the rupture was through the whole thickness of the organ; in 1 or 7·1 per cent. the ruptures were both deep and superficial; in 1 or 7·1 per cent. they were deep; and in 5 or 35·7 per cent. no records could be found.

*Position of Ruptures.*—The situation of the ruptures of the spleen in these fourteen cases were as follows:—In 2 or 14·2 per cent. they were through the whole thickness of the viscus; in 2 or 14·2 per cent. they were on the inner surface and through the hilus; in 3 or 21·4 per cent. the inner surface was reduced to pulp; in 1 or 7·1 per cent. the rupture was through the inner surface, the hilus, and the lower end; in 1 or 7·1 per cent. at the inner surface, the hilus, and upper end; in 1 or 7·1 per cent. on the inner surface; in 1 or 7·1 per cent. the inner surface and upper end were ruptured into pulp; in 1 or 7·1 per cent. they were on both surfaces; in 1 or 7·1 per cent. they were confined to the outer surface and anterior margin; and in 1 or 7·1 per cent. the whole spleen was a mass of pulp.

*Number of Ruptures.*—In 4 or 28·5 per cent. there were two ruptures; in 5 or 35·7 per cent. the organ was reduced to pulp; in 4 or 28·5 per cent. there was one rupture; and in 1 or 7·1 per cent. there were five ruptures.

*Amount of Blood Effused.*—The following notes give the amount of blood extravasated in each case:—

NUMBER OF CASES.	PER CENT.	AMOUNT OF BLOOD FOUND.
1	7·1	4 oz. in the abdominal and 12 oz. in left pleural cavity.
1	7·1	8 ounces.
1	7·1	15 "
1	7·1	36 "
1	7·1	40 "
2	14·2	60 "
1	7·1	73 "
3	21·4	80 "
1	7·1	96 "
1	7·1	a "large quantity;" and
1	7·1	whatever blood was extravasated had been expelled, as the abdominal parietes were injured, and the internal organs had been expelled from the abdominal cavity by the pressure of a heavy brick building which had fallen on the person.

*Condition of the Blood.*—The blood was fluid and of a dark colour in the thirteen cases in which it had been extravasated.

*Region where Blood was Effused.*—In twelve of the thirteen cases in which blood was found, it existed in the abdominal cavity; and in one in the abdomen and the left pleura.

*Length of Time the Persons Survived after Receipt of the Injury.*—In 6 or 42·8 per cent. death was said to have occurred instantaneously; in 2 or 14·2 per cent. within half-an-hour; in 1 or 7·1 per cent. in about an hour; in 1 or 7·1 per cent. in 2 hours 15 minutes; in 1 or 7·1 per cent. in 5 hours 15 minutes; in 1 or 7·1 per cent. in 6 hours; in 1 or 7·1 per cent. it was reported as having occurred "shortly after;" and in 1 or 7·1 per cent. no notes could be found.

*Cause of Death.*—Death resulted from hæmorrhage in in 8 or 57·1 per cent. of these cases; from shock in 5 or

35·7 per cent. ; and from shock and hæmorrhage combined in 1 or 7·1 per cent.

*Months of the Year in which these Ruptures Occurred.*  
—4 or 28·5 per cent. of these ruptures of the spleen occurred in the month of June; 2 or 14·2 per cent. in each of the months of October and November; 1 or 7·1 per cent. in each of the following months—January, February, March, May, July, and August; and no rupture occurred during the months of April, September and December.

HISTORY OF THE CASE OF HOMICIDAL COMPLICATED RUPTURE OF THE SPLEEN.—I give below the history of the only case of homicidal rupture of the spleen which came under my notice under the head of complicated ruptures of this organ. An adult native male named Narain Dutt, who had been once employed as a khansamah or butler in the service of Babu Modon Mohun Dhur, had a woman named Sokhoda Raur in his keeping; having lost his appointment, and not having sufficient means to support her, she left him and went to live under the protection of a man named Gunga Ram. It having come to Narain Dutt's notice that his late paramour was in the habit of going daily to her mother's house to have her meals, he went there on the forenoon of the 23rd June 1883 and began to abuse the mother. On hearing this, Narain Chunder Dutt, son of the mother's landlord, upbraided Jogessur, a brother of Sokhoda Raur's, for allowing Narain Dutt to abuse his mother, and urged him to go out and drive him away, which he did, and Narain Dutt left. But he returned in a short time and renewed his abuse, on which Jogessur rushed out of the house at Narain Dutt, who ran away, and while running, in his hurry to escape, came with violence against the wall of a house in the street. He, however, continued his flight for a short distance, and then fell down, when Narain Chunder Dutt and Jogessur coming up to him assaulted him. Narain Dutt, shortly after being beaten, got up and went away. He was admitted into the Medical College Hospital on the night of

the 23rd June 1883, where he said he had been kicked and beaten by his creditors. He remained in hospital until ten o'clock on the forenoon of the 25th June 1883, when he expired. I made a post-mortem examination on the body the same evening, with the following result:—

The body was found well nourished, and the only external mark of violence on it was a contusion half-an-inch long on the upper part of the left knee. The liver was large and soft. The spleen was large, soft, and pulpy. There were two ruptures through its substance—one was 5 inches long: it was deep, and extended along the anterior margin and outer surface; it was full of dark clotted blood—the other was superficial: it was 1 inch long, and was also on the outer surface of the organ. The kidneys were fatty. There were two ruptures of the left kidney: one was deep, it was 2 inches long, and extended from the pelvis to the outer margin, through the cortical substance—the other was superficial, it was about half-an-inch long, and was on the anterior surface of the organ. The remaining internal viscera were healthy. There were 40 ounces of dark fluid blood in the abdominal cavity. The fifth, sixth, seventh, and ninth left ribs were fractured about their centres. The liver and the kidneys were anæmic.

There were 2 drachms of dark fluid blood in the right ventricle of the heart; the other cavities of the heart were empty; the peritoneum was not inflamed.

The two men, Narain Chunder Dutt and Jogessur, were arrested and tried. The Jury at the Coroner's Court gave it as their verdict that the deceased Narian Dutt "died from injuries caused by an accidental fall." In the Magistrate's Court these defendants were both found guilty of assault, and were fined 5 Rs. each.

REMARKS.—It will be seen that 92·8 per cent of these complicated ruptures of the spleen were the result of accidents, and only 7·1 per cent. was a homicidal case, and there was not a single case of spontaneous rupture.

The accidents which caused these ruptures, it will be observed, were of a severe character—71·4 per cent. of the



vietims having suffered from violence enough to break their bones.

The injuries occurred in the persons of natives only, the majority of whom were adult males.

External marks of injury were present in 78·5 per cent. of the complicated ruptures of the spleen, while they were only found in 31 per cent. of the cases of uncomplicated ruptures of this organ. The external marks of violence were found in the majority of these cases on parts of the body distant from the seat of injury to the spleen, as was the case in the uncomplicated ruptures of the viscus.

In these complicated ruptures, 71·4 per cent. were accompanied with fractures of bones; while in the uncomplicated cases, injuries to these structures were found in 24 per cent. In both classes of ruptures of the spleen, the fractures present were found, in the majority of the cases, to be in the ribs.

As in the non-complicated cases so in those complicated with other ruptures, the majority of the bodies were well nourished, although their spleens were diseased, again showing that it is impossible to diagnose by external appearances only if this organ is diseased or not.

In all these ruptures in which notes were retained regarding the nature of the injuries, they were found to be of a severe character.

As in the non-complicated cases, so in the majority of these the inner surface was injured.

As in the other class of injuries of the spleen, more than a single rupture, as well as the spleen being reduced to a state of pulp, were present in the majority of these cases.

As found in the other ruptures of the spleen, in most of these a large quantity of blood was extravasated into the abdominal cavity.

In all these cases where blood was found to have been effused, it was of a dark colour and fluid character.

It is curious to note on referring to the time, that the persons who died from the complicated ruptures of the spleen survived longer—that is to say, 57 per cent. of



these died within half-an-hour; while in the non-complicated cases, 68·9 per cent. died within this time. It is probable that as the injuries were more severe in these complicated cases, most of them suffered more or less from shock, which most likely delayed the effusion of blood from the ruptured vessels of the injured organs.

The cause of death in 57·1 per cent. of these cases was due to hæmorrhage, while in the non-complicated ruptures 86·2 per cent. died from loss of blood: in these cases, 35·7 per cent. died from shock; in the other class, 6·8 per cent.: in the uncomplicated cases, 3·4 per cent. died from the combined effects of shock and hæmorrhage; while in the complicated ones, 7·1 per cent. died from the same causes.

These complicated ruptures occurred in nine out of the twelve months of the year; four in June; two in each of the months of October and November; and one in each of the remaining months, excepting April, September, and December, in which there were none.

**RUPTURES OF THE INTESTINES.**—The next in order of frequency, after the rupture of the spleen, I found to be ruptures of the intestines.

There were 12 ruptures of the intestines; 11 or 91·6 per cent. of these were uncomplicated with injuries to other internal organs, while 1 or 8·3 per cent. was accompanied with two superficial ruptures of the liver.

*Classification of Ruptures of Intestines.*—As I did in the case of the ruptures of the liver and spleen, I propose to consider these cases also under two heads—those in which the only rupture was that of the intestines, and the ease in which it was accompanied with ruptures of the liver.

*Cause of Non-complicated Ruptures of Intestines.*—Of these 11 cases, 10 or 90·9 per cent. were accidental, and 1 or 9 per cent. was homicidal.

*Reasons assigned for the Accidents.*—In 4 or 40 per cent. the persons injured were kicked in the abdomen by

horses; in 2 or 20 per cent. persons were struck in the abdomen by pieces of wood; in 1 or 10 per cent. a person was run over by a carriage; in 1 or 10 per cent. it resulted from a fall on a large piece of timber; in 1 or 10 per cent. of the cases a person was jammed between a boat and a pontoon; and in 1 or 10 per cent. a man was crushed between two railway trucks.

*Homicidal Case.*—This case will be described more fully further on.

*Race and Sex.*—10 or 90·9 per cent. were adult native males, and 1 or 9 per cent. was a Eurasian boy.

*External Marks of Violence.*—On 4 or 36·3 per cent. marks of external violence were present, and in 7 or 63·6 per cent. they were absent.

*Region of External Injuries.*—In 1 or 25 per cent. injuries were found in the abdominal region, and in the remaining 3 or 75 per cent. they were found on parts of the body distant from the abdomen.

*Fractures and Dislocations of Bones.*—In 1 or 9 per cent. bones were found to be fractured, in 9 or 81·8 per cent. no injury to bones could be detected, and in 1 or 9 per cent. both iliac bones were dislocated from the sacrum.

*Bones found Fractured.*—The only case in which an injury was found was a fracture of the seventh rib of the left side of the thorax.

*Condition of the Bodies.*—The bodies of 10 or 90·9 per cent. were well nourished, and that of 1 or 9 per cent. was fairly nourished.

*Portions of Intestines Ruptured.*—The upper portion of jejunum was ruptured in 4 or 36·3 per cent. of the cases; the lower portion of the jejunum in 2 or 18·1 per cent.; the middle of the jejunum in 1 case or 9 per cent.; the ilium in 1 or 9 per cent.; the cæcum in 1 or 9 per cent.; in 1 or 9 per cent. there were ruptures of the lower portion of the jejunum and of the upper portion of the ilium; and in 1 or 9 per cent. the ruptures were present in the lower part of the jejunum and in the sigmoid flexure.

*Number of Ruptures.*—In 2 or 18·1 per cent. the intestines were ruptured in two places, and in 9 or 81·9 per cent. in one.

*Contents of Intestines.*—In 2 or 18·1 per cent. the *large* intestines contained well formed fæces, and the *small* semi-consistent fæces; in 2 or 18·1 per cent. the *large* contained semi-consistent fæces, and the *small* were empty; in 2 or 18·1 per cent. the intestines were empty; in 1 or 9 per cent. they contained round worms; in 1 or 9 per cent. they were full of well-formed fæces; in 1 or 9 per cent. they had fluid fæces; in 1 or 9 per cent. they contained well-formed fæces and round worms; and in 1 or 9 per cent. no record could be traced.

*Nature of Substance Extravasated into Abdominal Cavity.*—In 3 or 27·2 per cent. fæcal matter and fluid were found in the abdominal cavity; in 2 or 18·1 per cent. fæcal matter and blood; in 2 or 18·1 per cent. no extravasation had taken place; in 1 or 9 per cent. only blood was found; in 1 or 9 per cent. blood and fluid; in 1 or 9 per cent. fæces, fluid, and blood; and in 1 or 9 per cent. fæces alone.

*Length of Time Deceased Survived after the Accident.*—1 or 9 per cent. died in seven hours; 1 or 9 per cent. in twelve hours; 2 or 18·1 per cent. in twenty-four hours; 1 or 9 per cent. in twenty-nine hours; 2 or 18·1 per cent. in thirty hours; 1 or 9 per cent. in fifty-eight hours; 1 or 9 per cent. in three days; 1 or 9 per cent. in five days; and 1 or 9 per cent. in eight days.

*Cause of Death.*—In 9 or 81·8 per cent. the cause of death was peritonitis, and in 2 or 18·1 per cent. it resulted from shock.

**HISTORY OF THE HOMICIDAL CASE.**—About noon of the 8th September 1883, a native named Newal Kissoree Chowbey, accompanied by his servant, Hurree Lall Kurmee, went to Bentinck Street, Calcutta, to purchase a pair of shoes. Among other shoemakers' shops, they visited that of a Chinaman, named Ahgain: here they

bargained for a pair of shoes, and there was a dispute between them whether they were to get the shoes for 5 Rs. or for 4-2 Rs. the pair. The dispute ended in a fight, when Ahgain is reported to have abused and struck Newal Kissoree Chowbey with a piece of bamboo. At this moment another Chinaman, named Yeson, is said to have seized the deceased by a piece of cloth which was round his neck, to have dragged him about the shop, and to have kicked him in the abdomen. A native police constable arrived on the scene of the assault, and took the two natives and the two Chinamen to the thannah or police station. The police then took the deceased to the nearest hospital, where he refused to stay, and went to his house, where he was under the treatment of several native medical gentlemen, and died about 1 P.M. on the 13th September 1883, or about five days after the assault. I made an autopsy on the body the next day, when I found it to be well nourished, and to have no external marks of violence on it. There was some mucus mixed with fluid blood oozing out of the mouth and nostrils. The lungs were congested. The heart was healthy; there was some dark fluid blood in the right cavities of the heart; the left ones were empty. The liver was slightly enlarged, the spleen was soft and congested, and the kidneys were healthy. The stomach was healthy, and contained 8 ounces of a brown-coloured fluid. The intestines were healthy. There was a rupture of a circular shape the size of a three-penny piece or two-anna bit through all the coats of the lower third of the jejunum; there was lymph extravasated around this opening. The abdominal cavity contained 72 ounces of a brown-coloured fluid emitting a strong fæcal odour. The peritoneum was inflamed, lymph had been exuded, and had matted its layers together as well as to the external coats of the intestines. The bladder was healthy, and was empty. The substance of the brain was healthy; the vessels of the brain were congested. There was a quantity of serum effused over the surface of the brain. No bones were fractured. I expressed my opinion that the deceased died from peritonitis following the rupture of the intestines.

The two Chinamen were tried on the 24th November 1883, at the Criminal Sessions of the Calcutta High Court on two counts—culpable homicide not amounting to murder, and doing a rash and negligent act. They were ably defended by Counsel, and were acquitted by the Jury on both charges.

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REMARKS.—It will be seen that 90·9 per cent. of the non-complicated ruptures of the intestines were the result of accidents, and 1 or 9 per cent. was a homicidal case.

The majority of the accidental cases resulted from kicks from horses.

In 90·9 per cent. the persons injured were adult native males, and 1 or 9 per cent. was a Eurasian boy.

It will be observed that external marks of violence were present in 36·3 per cent., and were absent in 63·6 per cent.

It will further be seen that in those cases in which external marks of violence existed, in only 25 per cent. they were on the abdominal parietes; and in 75 per cent. on parts distant from the seat of injury.

In only 9 per cent. were bones found to be fractured; and in the same number dislocations were found to be present; while in 81·8 per cent. no injury was detected in the osseous structures.

The bodies of 90·9 per cent., it will be observed, were well nourished; and in 9 per cent., although not well nourished, were not emaciated.

The ruptures of the intestines were limited to the small intestines in 81·8 per cent. of the cases; to the large intestines in 9·1 per cent.; and in 9·1 per cent. they were found in both the large and small intestines. It will further be seen that the most frequently ruptured portion of the small intestines was the jejunum. These ruptures were most commonly found in one part only of the intestines. They occasionally occurred in two places, but not in a single case were they found to exist in a larger number than two.



The period of death following the ruptures of the intestines, it will be noted, varied from 7 hours to 8 days: the average period of death after receipt of the injury in these cases was 49 hours 27 minutes. It may also be remarked that 63·6 per cent. of them died within 30 hours.

Death in 81·8 per cent. of these cases resulted from peritonitis, and in 18·1 per cent. from shock.

**HISTORY OF THE ONLY COMPLICATED RUPTURE OF THE INTESTINES.**—On the evening of the 25th January 1886, a native, named Bhubendro Lall Mitter, was travelling, while somewhat intoxicated, by tram-car with a tin box; he alighted from the car with the box in his hands, and fell on the road. He was removed to the Medical College Hospital, where he died on the following evening. I made an autopsy on the body on the 27th January 1886, when I found it to be that of a man of about 40 years of age, to be well nourished, and to have a deep crescentic-shaped contused wound of the right eyebrow, 3 inches long and 1 inch broad, a deep contused wound of the right cheek just below the lower lid of the right eye, and six abrasions varying in size from half-an-inch to 6 inches in length on the chin, the right elbow, and both knees. The lungs were congested. The heart was healthy, the right side contained dark fluid and clotted blood, and the left cavities were empty. The liver was large, fatty, and anæmic. There were two superficial ruptures of the upper surface of the right lobe—one was 5 inches, and the other 2½ inches long. The spleen was healthy; the kidneys were healthy; the stomach was healthy, and contained 4 ounces of a yellow-coloured fluid; the intestines were healthy, and contained semi-consistent fæces. There was a rupture through the whole circumference of the small intestines at the lower third of the jejunum. There were 28 ounces of dark fluid blood in the abdominal cavity, but no fæcal matter could be detected in it. The bladder was healthy, and was empty. The substance of the brain was healthy, and the vessels of the brain were congested. The omentum was inflamed,



and there was a laceration 9 inches in length along its left side. The remaining portions of the peritoneum were inflamed, but not injured. The cartilages of the fourth, fifth, sixth, and seventh ribs of the right side of the thorax were fractured. The seventh, eighth, ninth, and tenth ribs of the left side were fractured about their middle. No smell of alcohol could be detected in any of the internal organs.

**RUPTURES OF THE HEART.**—During the period I have been writing about, I have had six cases of rupture of the heart. Of these six ruptures, 5 or 83·3 per cent. were not complicated with ruptures of other internal viscera, while 1 or 16·6 per cent. was so.

*Classification of the Ruptures of the Heart.*—As I have done in the case of ruptures of other internal organs, so in considering ruptures of the heart, I shall classify them under the heads of non-complicated and complicated ruptures.

*Cause of Non-complicated Ruptures of the Heart.*—All the five cases were the result of accidents.

*Reason assigned for the Accidents.*—In 3 or 60 per cent. of these cases the accidents were caused by the falling of heavy weights on the chest—as for instance a bag of grain, a bale of jute, and a heavy piece of wood. In 2 or 40 per cent. they had been run over by heavily-laden carts.

*Races and Sex.*—They were all natives, and males; 4 or 80 per cent. were adults, and 1 or 20 per cent. was a boy.

*External Marks of Violence.*—In 4 or 80 per cent. there were no external marks of violence visible; in 1 or 20 per cent. they were present, and these marks were found on the front of the thorax as well as on parts of the body distant from the seat of the injury.

*Fractures of Bones.*—In 3 or 60 per cent. fractures of bones were found, and in 2 or 40 per cent. there were no bones injured.

*Bones found Fractured.*—In 1 or 33·3 per cent. the sternum and a rib were fractured; in 1 or 33·3 per cent. the second, third, fourth, fifth, and sixth ribs of both sides of the chest were fractured; and in 1 or 33·3 per cent. the third, fourth, fifth, and sixth left ribs were fractured.

*Condition of the Bodies.*—All these bodies were found well nourished.

*Region of the Heart Ruptured.*—In 2 or 40 per cent. the left ventricle was ruptured near the apex of the heart; in 1 or 20 per cent. there were two ruptures, one extending from the apex upwards into the right ventricle and the other from the apex upwards into the left ventricle; in 1 or 20 per cent. the rupture involved the right auricle, the right ventricle, and the auricular septum; and in 1 or 20 per cent. the rupture was confined to the anterior wall of the right auricle.

*Condition of the Heart.*—Of these five cases, in 3 or 60 per cent. the heart was found to be healthy; in 2 or 40 per cent. it was diseased—both were fatty.

*Condition of the Pericardium.*—The pericardium in all these cases was healthy, but in 3 or 60 per cent. it was ruptured.

*The Quantity of Blood Effused.*—In 1 or 20 per cent. 32 ounces of blood were effused; in 1 or 20 per cent. the pericardium was found to be “full of blood;” in 1 or 20 per cent. 20 ounces of blood were found; in 1 or 20 per cent. 64 ounces were present; and in 1 or 20 per cent. 8 ounces.

*Region where the Blood was Effused.*—In 2 or 40 per cent. the blood was found within the pericardial sac; in 1 or 20 per cent. in the pericardium, as well as both pleural cavities; in 1 or 20 per cent. in both the pleural cavities; and in 1 or 20 per cent. in the right pleural cavity.

*Nature of the Blood Effused.*—In 2 or 40 per cent. the blood extravasated was fluid and clotted, in 1 or 20 per cent. it was fluid, and in 2 or 40 per cent. no notes were found.

*Length of Time the Deceased Survived.*—In 4 or 80 per cent. death was said to have occurred instantaneously, and in 1 or 20 per cent. the man died within half-an-hour after receipt of the injury.

*Cause of Death.*—As was to be expected the five persons died from syncope.

REMARKS.—All these ruptures of the heart were caused by accidents—60 per cent. of them resulted from heavy articles falling on the front of the thorax, while 40 per cent. were run over by heavily-laden carts. They were all native males—four were adults and one a boy.

In 80 per cent. there were no external marks of violence visible on the body, while in 20 per cent. external injuries were found not only on the front of the thorax but also in other parts of the body distant from the precordial region.

In 60 per cent. bones were found to be fractured, and in 40 per cent. injuries to the osseous structures were absent. The fractures were limited to the ribs and to the sternum.

The bodies of all those who died from these ruptures were found well nourished.

These ruptures were limited, in 40 per cent. of the cases, to the left ventricle of the heart; in 20 per cent. they were found in both the ventricles; in 20 per cent. they existed in the right auricle, the right ventricle, and the auricular septum; and in 20 per cent. only the anterior wall of the right auricle was injured.

In 60 per cent. the heart was healthy, and in 40 per cent. it was found to be fatty.

The pericardium was found to be ruptured in 60 per cent. of the cases, and was intact in 40 per cent. In all these cases it was healthy.

In 40 per cent. of these accidents, the blood was found in the pericardial sac, in 20 per cent. in the pericardial and the pleural cavities, in 20 per cent. in the pleural cavities and in 20 per cent. in the right pleural cavity only.

In 40 per cent. the blood effused was fluid as well as clotted, in 20 per cent. it was fluid, and in 40 per cent. no note was made.

Death occurred in 80 per cent. of the cases instantaneously, and in 20 per cent. within half-an-hour. In all these cases the persons died from syncope.

**HISTORY OF THE COMPLICATED CASE OF RUPTURE OF THE HEART.**—Saboo Tailee, a cooly or labourer, of about 30 years of age, was working on board the steamer "Hispania" in the port of Calcutta, on 15th June 1885, and was standing with a fellow-labourer on a closed hatch. An empty sling, while being hoisted up by means of the steam winch, caught this closed hatch and displaced it, precipitating both men into the hold of the vessel. Saboo Tailee was picked up dead, while his companion was not hurt. I examined the body of Saboo Tailee the next day, when I found it to be well nourished, and to have no external marks of injury on it. The lungs were healthy. The pericardium was healthy, but was ruptured. The heart was healthy, and was empty. There was a longitudinal rupture, 3 inches long, through the anterior wall of the right ventricle. There were 20 ounces of dark fluid blood in the right pleural cavity, and 40 ounces in the left pleural cavity. The liver was large, soft, and anæmic. The kidneys were healthy and were anæmic. The spleen was large, soft, and anæmic. There was a deep rupture on the inner surface and through the hilus of the spleen 3 inches long. There were 8 ounces of dark fluid blood in the abdominal cavity. The stomach, the intestines, and the bladder were healthy, but were anæmic. The substance of the brain was healthy. The vessels of the brain were anæmic. There was a simple fracture through the manubrium of the sternum. The fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh, and twelfth ribs of the left side of the thorax were fractured close to their costal cartilages and about their centres.

It is curious to note that, although this man fell a distance of about 20 feet into the vessel's hold, when he

received a severe and fatal rupture of the heart and of the spleen, and fractures of the sternum and of nine ribs, which resulted in instantaneous death, he had no external marks of injury on his body.

**RUPTURES OF THE KIDNEYS.**—Two ruptures of the kidneys came under my notice during the nine years under consideration. One of these was complicated with superficial rupture of the posterior margin of the right lobe of the liver; the other was not complicated with any injury to other viscera. Both resulted from being knocked down and run over accidentally by carriages—one the complicated case, was an adult native male; the other, the non-complicated one, was a native girl. The bodies of both were well nourished. The girl had three contusions on the right thigh, the left knee, and right ankle. The man had no external injuries. The lungs, the heart, the liver, the stomach, the intestines, the uterus, the ovaries, the bladder, and the substance of the brain were healthy. The spleen was large and hard; its capsule was thickened and was opaque. The liver, the kidneys, the stomach, the lungs, the intestines, the bladder, the ovaries, the uterus, and the vessels of the brain were anæmic in the girl. In the man, the lungs were congested, the heart and the liver were fatty, the stomach, the intestines, the bladder, and the substance of the brain were healthy; and the spleen was soft. The girl had a fracture through the middle of the right femur—the man had fractures of the sixth, seventh, eighth, ninth, tenth, eleventh, and twelfth ribs of the left, and of the fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh, and twelfth ribs of the right side of the thorax. The kidneys of the girl were healthy—those of the man were fatty and congested. The right kidney of the former was ruptured into three fragments—the posterior surface of the right kidney of the latter was ruptured into pulp, and there were two other ruptures at the anterior surface of the same kidney. The abdominal cavity was full of dark fluid blood in the girl; and in the man there were 4 ounces of fluid blood in the abdomen, 8 ounces in the



right and 4 ounces in the left pleural cavities. The girl died within half-an-hour from hæmorrhage, but the man lived 38 hours after the accident, and died from shock.

**RUPTURE OF THE BLADDER.**—Only two cases of rupture of the bladder came under my notice during the nine years under consideration. One was in the person of an adult European, the other of an adult native male. They both resulted from accidents. One (the European) fell out of the window of a two-storied house down to the ground—a distance of about 25 feet—while intoxicated: the other (the native) was jammed between a sling containing several bags of grain and the hatchway of a vessel. The European had several contusions, varying in size from 2 to 6 inches in length, in the lumbar region and in both groins. The native had no visible external marks of injury. The European had fractures of the fourth, fifth, sixth, and seventh left ribs; the ramus of the left pubis was fractured into two pieces, and there was a fracture of the styloid process of the left radius. No bones were injured in the person of the native. The European died in 12 hours, from shock; while the native lived for 10 days, and died from pelvic cellulitis. There was a rupture 2 inches long at the upper part of the body of the bladder in the European, and one the size of a shilling or eight-anna piece at its neck in the native. There was no hæmorrhage or urine extravasated into the abdominal cavity of the European; while in the native the cellular tissues of the pelvis and lower part of the abdomen, as well as the walls of the bladder, were infiltrated with dark blood, and the tissues of the scrotum were infiltrated with dark fluid blood. Both bodies were well nourished. The bladder was healthy in the European; while its coats were thickened and congested in that of the native, and it contained 8 ounces of urine mixed with blood. In the European, the heart and the kidneys were large and fatty, the liver was large, fatty, and congested; the spleen was large, soft, and congested; the stomach, the intestines, and the substance of the brain were healthy; and the lungs and the vessels of the brain were congested.



In the native, the lungs, liver, spleen, larynx and trachea, and vessels of the brain were congested; and the heart, stomach, intestines, œsophagus, and the substance of the brain were healthy.

**RUPTURE OF THE RIGHT URETER.**—A cooly or labourer named Shaik Motabar, while working at No. 6 Jetty, on the banks of the river Hooghly, on the afternoon of the 9th January 1882, was jammed between two heavy trucks. He walked home, and only sought admission into hospital next morning, where he died about midday. I examined the body on the 11th January, when I found it to be well nourished, and to bear no external marks of injury. The lungs and the vessels of the brain were congested. The heart, the liver, the spleen, the kidneys, the stomach, the intestines, the bladder, and the substance of the brain were healthy. The whole of the peritoneum was highly inflamed and matted together, and was adherent to the outer coats of the small intestines by means of organized lymph. The ureters were healthy, and there were two small ruptures, each the size of a pea, in the right ureter. The abdominal cavity contained two pints of urine mixed with blood. No bones were fractured.

I expressed it as my opinion that the deceased died from peritonitis, following the extravasation of urine into the abdominal cavity through the ruptures of the right ureter.

**RUPTURE OF THE UTERUS WITH LACERATIONS OF THE VAGINA.**—C. B., a native woman of about 25 years of age, who had been in labour several days, was brought to one of the large Calcutta hospitals, on the morning of the 24th April 1886, in an exhausted and moribund condition, and died before she could be delivered by means of the forceps.

I made a post-mortem examination on the body the same day, when I found it to have no external marks of violence. Putrefaction had commenced in the face, the upper extremities, the thorax, the abdomen, and the thighs. The corpse was on one of the dissecting tables of the dead-house on its back: there was a fully developed

male dead child, with the umbilical cord and placenta attached, lying face downwards between the lower extremities of the deceased. The child had been apparently expelled through the maternal passages by means of the gases generated in the process of putrefaction. I found the lungs, the kidneys, the mucous membrane of the pharynx, the œsophagus, the larynx, trachea, and large bronchi, as well as the vessels of the brain, to be congested. The heart, the liver, the spleen, the stomach, the intestines, and the bladder, I found to be healthy. The substance of the brain was soft from putrefaction. The uterus was 12 inches long,  $8\frac{1}{2}$  inches broad, and its walls were half-an-inch thick at its fundus. The mucous surface was highly congested and was soft and easily torn. The fundus of the uterus was inverted, and was found between the thighs. There was a rupture 2 inches long and 2 inches broad, through the anterior wall of the cervix uteri and of the upper part of the anterior wall of the vagina. There were also two lacerations through the anterior wall of the vagina, one  $2\frac{1}{2}$  inches long and  $1\frac{1}{2}$  inches broad, the other  $1\frac{1}{2}$  inches long and 1 inch broad. The vagina was distended and was highly congested. There were extensive extravasations of blood into the whole of the cellular tissues of the pelvic cavity. No bones were found to be fractured.

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#### A CASE OF RUPTURE OF THE RIGHT PHRENIC NERVE FOLLOWED BY INSTANTANEOUS DEATH.

ON the forenoon of the 18th August 1883, a cooly or porter, named Dagan Koorme, while carrying a bag of tamarind fruit from the river side to a boat on the river bank, slipped and fell on his back, with the bag on the front of his thorax. His fellow-labourers picked him up at once, but found he was dead. The police had the body removed to the Calcutta morgue, where I examined it about 22 hours after death, with the following result :—

The body was that of an adult native male of about 40 years of age. It was well nourished, and no external mark of violence could be detected on it. The lungs were found to be highly congested. The heart was healthy. The right cavities of the heart were full of dark fluid blood. The left cavities were empty. The liver, the spleen, the kidneys, and the vessels of the brain were congested. The stomach, the intestines, the bladder, the larynx and trachea, the œsophagus, and the substance of the brain were healthy. No bones were fractured.

The only injury which could be detected was a rupture of the right phrenic nerve in front of the root of the right lung.

I gave it as my opinion that the deceased died from the rupture of this nerve.

REMARKS.—I have during the nine years medico-legal experience I have been considering had, exclusive of this case, 7 deaths from precisely similar accidents, in 5 of them the cause of death was ascertained to have resulted from fractures of one or more of the cervical vertebræ, with injury of the spinal cord; and in 2 from shock following fractures of the sternum.

I have not been able to find a case exactly similar to the one I have given above in any medical work. The only case I can find regarding injuries to the phrenic nerve is in Erischsen's "Science and Art of Surgery" (seventh edition), Vol. I., at page 605, and which is as follows:—

"The division, however, of the respiratory nerves on the one side only, or even of one of them, would in all probability be fatal in man by interfering with the proper performance of the respiratory act. In a case with which I am acquainted, while the phrenic nerve was divided during ligature of the subclavian artery, death resulted in a few days from congestion of the lungs."